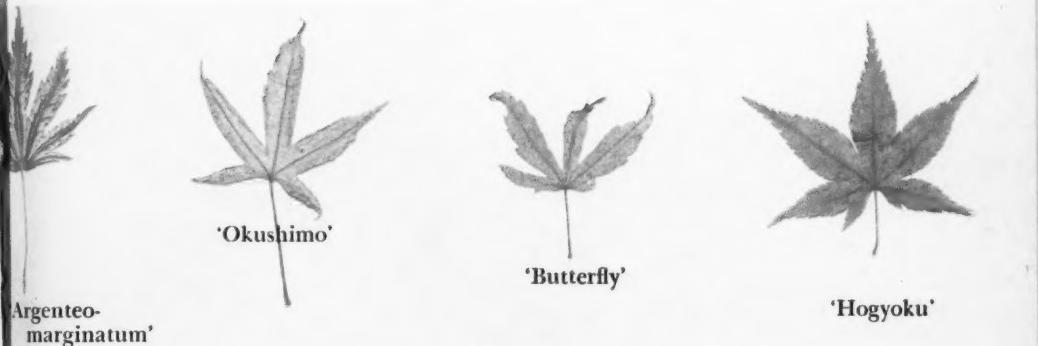
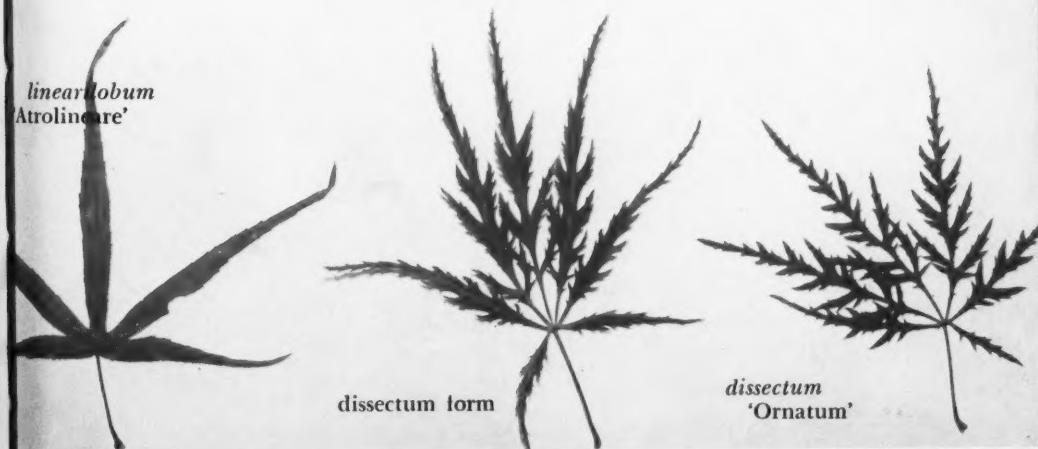


THE NATIONAL Horticultural MAGAZINE



Leaf variations in forms of Acer palmatum



AMERICAN HORTICULTURAL SOCIETY
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The National
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Publications available from the American Horticultural Society

THE AZALEA BOOK

Frederic P. Lee. Published by D. Van Nostrand Company, Inc., Princeton, New Jersey and sponsored by the Society. 1958. 324 pages, 6 pages illustrated in color, 56 black and white illustrations. Cloth bound. \$6.45, postpaid, special price to Society Members; \$8.95, postpaid to non-members.

This handsome and unique book tells everything there is to know about azaleas, from setting out a few plants and keeping them healthy in a backyard garden to identifying rare specimens through a descriptive list of about 70 species and 3,000 varieties.

HANDBOOK OF HOLLIES

Harry William Dengler, Guest Editor and 26 contributors in various fields of holly growing. 1957. 193 pages, 1 color illustration and 61 pages of black and white. Paper bound. \$3.00, postpaid.

Descriptive list of the North American, Oriental, and English species and varieties of hollies with their care and uses—planting, pruning, pests, diseases, propagation, hybridizing, landscape use, hedges, screens, barriers, topiary, bonsai, orcharding and cut arrangements.

ANNIVERSARY ISSUE

A selection of a few of the classical articles that appeared in the previous 34 volumes of *The National Horticultural Magazine*. October 1955. 113 pages. *Franklinia alatamaha* illustrated in full color on the cover, 71 black and white illustrations. Paper bound. \$1.00, postpaid.

Liberty Hyde Bailey's "The Joy of Growing Plants" commences the issue, followed by: The Gentle Art of Weeding, Roscoea, Some Californian Flowering Shrubs, Neglected Native Plants, The Stewartias, Kalanchoes for the Window Garden (19 species illus.), Franklin's Tree, Lewisia, Trilliums (11 species illus.), Notes on Calochortus (14 species illus.), and Erythroniums—all written by prominent names of horticulture.





The pendent flowering raceme of Acer cissifolium

See Page 247

Dwarf Bearded Iris

WALTER WELCH*

It has been said by a notable breeder that interest in any group of flowers is in proportion to the development of the group through breeding and hybridizing. A conspicuous example of this is the modern dwarf bearded iris. As recently as ten years ago, when I began serious work in the exploration and development of dwarf bearded iris, we heard little of them; only old and inferior varieties were available and dealers listed a few in the back of their catalogues merely as a service to their customers. In color they were restricted to tones of purple and pale yellow, and an occasional near white form, and were mostly forms or derivatives of a species called *I. chamaeiris*, which is the largest and latest blooming of the dwarf bearded iris species.

OLDER VARIETIES

The varieties which were familiar in that day were the introductions of the Sass Brothers, among which were Sound Money, Tiny Tony, Rose Mist, and Little Jewel, and a few from Burchfield, as Buzzer, Harbor Lights, Endymion, and Huron Imp. In addition to these there were those old favorites, Coerulea, Azurea, and Atroviolacea. Little is known of their origin even today. They are popularly known as Pumila Hybrids, regarded as derived from a cross of *I. chamaeiris* × *I. pumila*.

Considering the undevelopment in this class of iris, and the restricted color range, it is understandable that gardeners had neglected them in the past, yet dwarfs have always maintained some interest for rock gardens, in spite of their deficiencies.

The first break from these older types came when Paul Cook introduced his

variety Keepsake, a hybrid of Socrates × *I. arenaria*, the latter regarded by some as a variety of *I. flavissima*. He later put out two Pumila Hybrids, named Alinda and Violet Gem, though these were still in the purple color range. Around 1943 H. M. Hill introduced four new hybrids from *I. chamaeiris* × *I. arenaria* breeding, which practically established a new type of dwarfs in commerce. There were Tiny Treasure, Mist O'Pink, Cream Tart, and Bronya. These were still within the purple and yellow range.

MODERN DEVELOPMENTS

The first revolutionary change came when I introduced two new varieties named Blarney and Primus; the first of a green amoena color pattern, the latter a variegata color pattern with yellow standards and reddish falls with border of yellow. From then onwards there has been a continuous flow of new colors and patterns, each the first of its kind to be known in dwarf bearded iris. In the following years came April Morn, the first real blue pumila; Lavender Dawn, a lavender hybrid from Balkana × *I. mellita*; Blue Spot, the first neglecta color pattern of pure *I. pumila* extraction; Sparkling Eyes, a Wabash type amoena with white standards, violet falls, white border and beard; Red Gem, our first approach to red; Gay Lassie, the first of the Pinnacle type, with white standards, yellow falls with white border; Cherry Spot, a red amoena; and Little Joe, a black comparable with the blacks in tall bearded iris. There are Bright White and My Daddy, whites of the *I. chamaeiris* and *I. pumila* types, respectively. There are unique forms not found in other classes of iris, such as Dream Child, with blue standards, yellow falls, and Hullabalu, with blue standards, blended falls. Paul Cook put out a pinkish *I. chamaeiris* × *I. arenaria* hybrid named Promise, and there is a new deep orange called Fortissimo.

*Walter Welch of Middlebury, Indiana, is president of the Dwarf Iris Society and supervisor of its test garden and experimental research program. For his work with dwarf iris he recently received the Hybridizers Medal of the American Iris Society.

Today we can boast of practically all colors and patterns known in the tall bearded iris, with the exception of pli-cata and the new tangerine pinks, and we expect to have these in time.

In addition to the new colors and patterns, there is an added variation obtained from various color beards. We have grown so accustomed to yellow beards in tall bearded iris that until we see the dwarfs we are seldom aware of beards. It is almost unbelievable to note the effect that a contrasting beard can have upon a flower. For example, in the blacks we have pure white beards, bronze, and deep violet. We have yellows with blue and violet beards; purples with orange, white, or blue beards, and apparently any of these beards are interchangeable at will by the breeder.

Another advantage in the dwarfs is that there is a variety of size, type, form, and season of bloom. If you have a white in the *I. chamaeiris* type, that does not end your wants; you will need a white *pumila*, or various hybrid combinations, each distinct and different from each other in numerous ways.

By season of bloom is meant the range within the dwarf bearded iris season limits. The *I. pumila* forms start first, a short time after the crocus, then come the Pumila Hybrids, followed by the *I. chamaeiris*, *I. mellita*, and *I. arenaria* forms, but each overlapping, giving a duration of approximately five weeks. Apparently, season of bloom is tied in with size of plant, as the first blooming forms are the smallest, as *I. pumila* and *I. attica*, then the Pumila Hybrids, and lastly, the *I. chamaeiris* forms which are the largest. These range from four to ten inches normally.

From the above presentation you can recognize that there has been a great change from the older types of dwarf iris to our modern developments. Perhaps you may be curious to know how this was achieved in so short a time. It is all due to the use of new species in our work. I started work with the dwarfs by intercrossing the ordinarily available varieties, but soon learned that the potential was limited, that we needed something different for breeding materials. A trip to Paul Cook's garden, where I saw some plants of the species *I. pumila*, convinced me that this was the material that I needed. Paul Cook had only

a limited supply of this species, but he gave me a seedling which later became quite famous as a parent, called Cook-1546. This was apparently pure *I. pumila*, as a cytological test indicated it had the expected 32 chromosomes and was typical in every way. Later I was able to obtain those three pumilas of Robert Schreiner's named Sulina, Nana, and Carpathia, which he had raised from seed collected in the Balkan area of Europe.

From these pumilas, intercrossed and crossed with other species and forms, were developed most of the modern dwarfs of today. In spite of the great diversity of new colors and forms already achieved, the species *I. pumila* has not as yet been fully explored or its full inherent capacities become known.

IRIS PUMILA

I. pumila has possibly the greatest color and pattern range of any known species of iris, with the possible exception of *I. attica* which we like to consider as the original diploid form from which *I. pumila* derived, though there are conflicting ideas on this, as yet. *I. pumila* covers a vast range of territory, extending from Austria, down the Danube Basin, to the Black Sea and over into the Crimea and Donets Basin area in lower Russia. All forms have as a normal chromosome complement — thirty-two chromosomes, that is, four sets of a basic number of eight chromosomes. Thus it is a tetraploid form, whereas *I. attica* has two sets of eight with a total of sixteen chromosomes.

Dykes distinguishes the *I. pumila* from *I. chamaeiris* forms by the former's having no stem, the bloom rising on a long perianth tube, and its seed pods having the inner partition walls opening into each other in the lower half of the pod. The seed pod or ovary of *I. pumila* is practically sitting on the rhizome, in contrast to most dwarfs which have the pod at the top of the stem right under the flower. The pod is round, shaped much like an acorn, with a sort of parchment texture upon drying. The spathe valves are rounded and have close wrapping which distinguishes it from forms of *I. mellita* and *I. reichenbachi* which have longer and sharply keeled spathes.

An interesting point which has not been brought out to my knowledge is the wide variation of the forms from different localities. The forms native to Austria are relatively coarse when compared with forms from other areas. The leaves are wider, longer, more coarse; the stem is shorter, with flower barely above the leaves; and the bloom is larger in relation to plant size. The daintiest forms I have seen come from the Crimean area. They have long and slender stalks, well above the leaves, which are often only two inches in height. The leaves are narrow, and the flower is small and nicely in proportion.

The Balkan forms appear to be intermediate between these two types, very dainty and desirable plants. There is a form, of which we have only one example, known as *I. cretica* which was found on the island of Crete, outside of normal *I. pumila* territory, by a collector named Atchley in 1929. This form is somewhat different from all other pumilas, having a slender and long stem resembling somewhat those found in *I. mellita*. It has a tendency to smokey color and the texture of the flower is reminiscent of *I. mellita*, yet its distinguishing characteristics and its chromosome complement indicate that it is a pumila or a very closely related form. Right now this form is receiving a lot of attention, from the fact that two different breeders have gotten plicata color patterns by crossing it with a tall bearded plicata. We must not jump to conclusions, however, thinking this form may have the plicata factor inherent. It is possible that when *I. cretica* throws a recessive white segregate, the plicata factor becomes dominant over the white recessive, thus giving expression.

The growth habit of the pumilas requires some consideration. As is well known, the botanical classification for dwarf bearded iris describes them as early blooming, seldom attaining twelve inches in height, and without branching, the flowers in a terminal cluster of one to three buds. To compensate for the lack of branching, one rhizome of *I. pumila* will put out from four up to ten flowering stalks, each with a single terminal flower, whereas with most iris there is one stalk rising from the end of each rhizome. The result is that each little

clump of *I. pumila* is a bouquet in itself, literally a mass of color, sometimes covering the leaves entirely. For those who have never seen this wonderful species, and few gardeners know it as yet, it will come as a surprise and fascinate all who see it.

BREEDING CONSIDERATIONS

I have dwelt particularly on *I. pumila* because, in truth, it is the king of dwarfs, for the breeder as well as for the gardener. But it by no means exhausts the possibilities of desirable forms in other kinds of dwarfs. To date we have concentrated more upon *I. pumila* than other species, when actually as yet we do not know what some of the other species have to offer. The dwarfs offer a challenge to the breeder, the scientist, and the experimenter through their versatility. In the tall bearded and other classes of iris, the species are all of a homogeneous type, so closely related that the different species will intercross and, having the same kind and number of chromosomes, will exchange and segregate out their full gametic range or full inherent qualities in various combinations. In the dwarfs we have species with different kinds and numbers of chromosomes, that are more distantly related. This results in many cases in possibilities of combination effects different from those possible with homogeneous forms. An example is my Dream Child, where evidently a blue parent combined with a Pinnacle pattern parent to produce a hybrid with blue standards and yellow falls.

A list of the dwarf bearded iris species available for breeding work would include *I. pumila*, *I. attica*, *I. pseudopumila*, *I. chamaeiris*, *I. reichenbachi*, *I. mellita*, *I. subbiflora*, *I. arenaria*, to name the most important ones, together with iris listed as botanical forms, varieties, and subspecies (and some as merely synonyms), such as *I. bosniaca*, *I. balkana*, *I. italicica*, *I. olbiensis*, *I. rubromarginata*, and others. It will be years before we have exhausted this vast field.

I mention a few matters which may be of interest to those who may be concerned with breeding dwarfs, as this field is very popular today among amateur hybridizers. From cytological and breeding tests, it has been found that there



Dwarf Bearded Iris

Top: Cup & Saucer, a *Chamaeiris-arenaria* Hybrid Lavender pink, five inches tall

Bottom: Spring Joy, an *Iris pumila* clone Neglecta pattern



Dwarf Bearded Iris

Top: Iris seedling H-530, typical Chamaeiris form

*Bottom: Little Bit, a Pumila Hybrid, two inches tall,
smallest iris known—plant on right is about six inches tall*

are three species with a basic number of eight chromosomes, all of which are apparently homologous and will interbreed freely. These are *I. pumila*, *I. attica*, and *I. pseudopumila*. There is another group which have a basic number of twelve chromosomes, which will interbreed compatibly. The chromosomes of these two groups are differentiated in kinds and numbers of chromosomes, to the extent that they will intercross to produce hybrids, but the hybrids function as amphidiploids or double diploids, that is, each type operates more or less independently, with no exchange of factors between the two chromosome groups. This often results in dual or double expression simultaneously or in combination. Sometimes it will affect fertility when the balance of elements are unequal.

Some of our most valuable varieties have been derived from advanced generation hybrids involving tall bearded iris \times *I. pumila*. As these hybrids are perfectly balanced, with two sets of tall and two sets of *I. pumila* chromosomes, they are fertile and can be carried on to further generations. The first generation cross from tall iris \times *I. pumila* produces a group of hybrids known as Lilliputs, which are a new kind of Intermediate. The older standard Intermediate was derived from tall iris \times *I. chamaeiris*. By crossing these Lilliputs back to *I. pumila*, we get a typical dwarf iris, that is with most of the characteristics of typical dwarfs.

There is one thing, however, which will bear some consideration. *I. pumila* has an anthocyanin inhibitor which suppresses the blue anthocyanin of tall iris, but not of *I. pumila* itself. This one has the scientists puzzled, trying to figure out how it functions. Thus, when you cross tall iris with *I. pumila*, the inhibitor wipes out the tall blue or purple, leaving it white, except for whatever yellow may be present in the fall; hence only the pumila colors will give expression in the hybrid. Our first red dwarf, Red Gem, came from Lights On \times Nana, and we had crossed these with a view to bringing down the red from Lights On. But later we learned through experiments that the yellow parts of Lights On had combined with the purple of Nana, resulting in a reddish color.

OUTSTANDING VARIETIES

As this is not a technical paper on the scientific and breeding aspects of bearded dwarfs, this brief explanation suffices at present. I think for the record, as well as for suggestions to persons interested in knowing the best varieties available today, that it is advisable to include here the latest Dwarf Iris Symposium of the Dwarf Iris Society. These are known as the 50 BEST DWARFS.

- Sparkling Eyes—Amoena, std. white, f. violet, 6½ in.
- Ablaze—Variegata, reddish-orange beard, 5 in.
- Veri-Gay—Variegata, white beard, 6 in.
- Red Gem—Red bitone, dark beard, 7 in.
- Little Joe—Black self, bronze beard, 5 in.
- Butterball—Arenaria hybrid, yellow, 8 in.
- Red Amethyst—Red pumila, bitone, 4½ in.
- Blazon—Maroon self, gold beard, 8 in.
- Cherry Spot—Red amoena, white beard, 7 in.
- Inchalong—Pumila hybrid, light yellow, 5 in.
- Buster Brown—Arenaria hybrid, brown bitone, 8 in.
- Orange Glint—Orange-yellow, orange beard, 7 in.
- Flaxen—Blue pumila, white beard, 4½ in.
- Promise—Arenaria hybrid, pink, yellow beard, 5 in.
- Dream Child—Blue std., yellow f., blue border.
- Honey Bear—Std. yellow, f. brown overlay, 5 in.
- April Morn—Blue pumila, white beard, 4½ in.
- Sky Patch—Blue bitone pumila, 4 in.
- Violet Night—Deep violet self, violet beard, 6 in.
- Cup & Saucer—Arenaria hybrid, lavender-pink, 5 in.
- Path of Gold—Clear yellow self, yellow beard, 8 in.
- Violet Gem—Pumila hybrid, dark violet, dark beard.

Stylish—Petunia-purple, lavender beard, 8 in.

Hanselmayer—Lemon pumila, white beard, 4½ in.

Blue Spot—Pumila neglecta, white beard, 4½ in.

Little Mohee—Pumila hybrid, brown bitone, 5 in.

Primus—Variegata, white beard, 6 in.

Butch—Dark purple, pure white beard, 6 in.

Lavender Dawn—Lavender self, lavender beard, mellita hybrid.

Whitone—Std. white, f. pale yellow, 8 in.

Little Villain—Violet-black, white beard, 7 in.

Zwanimir—Yellow, yellow beard, 7 in.

Sulina—Pumila, violet, dark beard, 4½ in.

Little Elsa—Std. white, f. pale yellow, 8 in.

Tiny Treasure—Arenaria hybrid, light yellow, 10 in.

Aurea—Pumila hybrid, blue bitone, 6 in.

Wee Admiral—Dark red-violet self, 7 in.

Tiny Tony—Red-purple, yellow beard, 7 in.

Beauty Spot—Onco-Reg-chamaeiris hybrid, purple, 9 in.

Atroviolacea—Pumila hybrid, red-purple, 5 in.

Cream Tart—Arenaria hybrid, yellow, 5 in.

Keepsake—Arenaria hybrid, yellow, 9 in.

Mist O'Pink—Arenaria hybrid, lavender-pink, 10 in.

Ylo—Arenaria hybrid, lemon-yellow, 9 in.

Moon Gleam—Sulphur yellow, yellow beard, 8 in.

Balkana—Purple, not the species.

Sound Money—Yellow self, chamaeiris type, 8 in.

Alinda—Pumila hybrid, red-purple, 7 in.

Blue Band—Pumila hybrid, blue bitone, 5 in.

Burchfield—Deep yellow self, yellow beard, 8 in.

USES OF DWARF BEARDED IRIS

With a collection such as the above varieties, early spring will always be something to look forward to, as all flowers are relatively scarce at that time of year. It is regrettable that many gardeners still are neglectful of the dwarfs in their plantings, for they are useful in so many ways. No rock garden is complete without numerous clumps of the dwarfs set among their other low growing plants, and no plant will make a better display of rich color in the garden.

I know of no better plant for an edging at the front of the perennial borders. They should be planted in individual clumps, each clump a different variety or color, set about ten inches apart, in a row along the front of the border, and about a foot back of the grass line. The tall bearded or other iris can be planted just back of these, so that after the dwarfs have completed their display, they do not interfere with the viewing of the later blooming iris. The dwarfs furnish a nice green edging for the remainder of the year.

I have a round bed six feet across, enclosed with a rock wall about sixteen inches high, with the top slightly rounded with dirt and some selected fancy stones interspersed among the plants. In this bed I grow thirty-eight different colors and patterns of pure *I. pumila*, and this is always an exciting display for visitors. This bed is a solid mass of color throughout the early spring season.

If you live on a hillside where you can have terraces and stone walls, this is an opportunity for a most satisfying display of color and small plants. With dwarfs the plant character is almost as enjoyable as the flowers, as their dainty proportions and clean and neat growth are a delight for close and intimate viewing.

The old-time gardeners used to have dwarf plantings near their doorways and along walks and paths. In visiting many old and now abandoned houses, I still find masses of that old and favorite little dwarf iris called Atroviolacea. This little purple dwarf can be found in old cemeteries all over the country, where it was carried along by the early pioneers, and often it has increased to plots as much as five feet across, with no culture or care.

CULTURE

The matter of growing dwarfs is quite simple if a few fundamental rules are considered. We must remember two important things in the culture of dwarfs. These are drainage and sunshine. Although dwarfs grow in the plains in their wild state, they are primarily hill and mountain plants, and require good drainage. More dwarfs are lost through lack of proper drainage than any other cause. They will not tolerate water standing around the plant for long periods. Here I live on a hillside, with a sandy-loam soil, and the dwarfs perform wonderfully for me. If you have clay or heavy soil, mix some sand or fine broken limestone chips with the soil. The iris seem to grow nicely in very sandy soil if some humus is added, and they prefer a fairly rich soil if one can arrange for proper drainage.

As to sunlight, they like full exposure, but will perform satisfactorily in light shade for part of the day. It is significant that in their native habitat, dwarfs are found growing mostly on the south and eastern exposure of hills, seldom on the north or west sides. They require small space, but they want that space without intrusion of other plants or weeds, or overhanging shrubs. Yet, it is surprising to find dwarfs giving fairly good performance under some adverse conditions. They are not a "fussy" plant that requires a lot of attention and careful handling. I have thrown loads of dwarfs onto the compost pile and the pile becomes covered with bloom. They can be thrown aside in the grass and next year they will have taken hold and will bloom in many cases.

As head of the Dwarf Iris Society, I get reports from all over the world in regard to the performance of dwarfs. From these reports one particular thing stands out. It is the need of winter dormancy. The dwarfs are native to areas and climates where cold winters are the rule, particularly *I. pumila*. In areas like our Deep South, where growing conditions exist during the entire year, the performance is abnormal. They seem to require the complete dormancy which only freezing produces.

In Southern California, and the lower Southern States, the flowering is more scarce, and rather intermittent throughout the entire year. A variety may bloom

in February or perhaps in June, and remontant blooming is not unusual. Apparently the *I. pumila* forms are the most difficult to grow under these conditions. The leaves of pumilas tend to die down during winter, whereas the *I. chamaeiris* forms remain evergreen and in fact show some growth during late fall. It is possible that this has some significance in the apparent better performance of the *I. chamaeiris* forms in these regions. In parts of Australia and New Zealand a similar condition prevails. Also in England, where it is mostly damp, with less sunshine, and very mild winters, they have some difficulties with pumilas, the *I. chamaeiris* forms giving a better performance. As most of America has sufficient winter weather for normal dormancy requirements, however, it is no problem to grow dwarf bearded iris of any type, and obtain the best of performance.

It may be interesting to know that some of the members of the Dwarf Iris Society up in British Columbia, Canada, are highly successful with the dwarfs. There the temperatures go to fifty below zero often and the winters are long, yet they have no complaints as to hardiness and performance.

Disease among the dwarf bearded iris is at the minimum. Seldom is rot to be found among the dwarfs, except where they are continually exposed to abnormal wet conditions. I have found the iris borer seldom attacks the dwarfs though it may be present in nearby clumps of tall bearded irises. I might mention that I have practically eliminated both rot and borers from my iris plantings by using ordinary gypsum with a little DDT mixed in, and throwing a handful of this mixture into each clump in the spring.

And, finally, let me say that there is no substitute for dwarf bearded iris for the early spring garden. They come at a time when we need flowers most, after the long winter has given us a craving for the outdoors. It can no longer be said that they bloom for a couple of weeks and are gone, as the season has been greatly extended with the pumilas and new varieties. We can no longer criticize them for lack of color and pattern range or variety of types and forms. They are the ideal plant for numerous places in the garden picture.

Dwarf Beardless Iris

STEPHEN F. HAMBLIN*

Most of the species of iris without beards grow to more than a foot tall, and thus, can scarcely be called dwarf. But there are truly dwarf forms of some of the taller species and several species that are really dwarf. A dwarf form (*I. sibirica nana*) of the Siberian Iris has been listed, but it is apparently not in this country, and imported seeds gave plants about two feet tall, not unlike some seedlings of the true Siberians. With the exceptions below noted, all beardless iris prefer a moist, acid soil. A dwarf form of the Water Iris (*I. laevigata*), the Tiny Water Iris, has been in Japanese lists, but has not been imported to be recorded.

SPURIA GROUP

In the Spuria group, one species, the Lowly Iris (*I. humilis*) from Hungary to Transcaucasia, rises to two inches, with two small leaves on the stem. The tiny flower is blue-violet, close to the soil, and blooms in May-June. The capsule has two long teeth; the seeds have the papery cellophane-like coat of this group. Seed is offered in Europe. Grass Iris (*I. graminea*), the plant of Linnaeus, from central and southern Europe and the Caucasus, is nearly a foot tall, the flattened stem topped by the leaves. The flowers are red-purple and bloom in May with odor of ripe plums. Seed is offered in this country, but as botany has used

this name for other species, there is no way to be certain of what will grow from this seed. Farrer Iris (*I. farreri*) is an eight-inch relative of *I. spuria*, violet in color. Bulgarian Iris (*I. urumovi*, syn. *I. sintenisi*) (Fig. 12) from southern Italy, the Balkan peninsula to Asia Minor also grows to eight inches, with the standards deep blue purple; falls, white, veined, blue. These small Spurias should be extensively tried in this country, but at present all interest in Spuria species is put on the tall sorts.

THE ALGERIAN IRIS

Algerian Iris (*I. unguicularis*, formerly *I. stylosa*) (Fig. 11) is not hardy to severe cold, being native to north Africa, Portugal to Greece, and Asia Minor. In its native home it blooms in March, so in regions of zero cold, it must be wintered in covered cold frame or in an unheated pit. It also imitates crocus in that it is practically stemless (two inches), the flower being just above the mat of evergreen leaves. After blooming, the foliage makes huge tufts. The original flower color was pale blue to purple and very fragrant, but a dozen color variations have been listed, from pure white to deep violet. In lands of little frost it is excellent as a rock plant, blooming while it is still winter in our northern states. It should be left undisturbed for many years as it resents transplanting. This is the only rhizome species without beard that is tender to severe cold. In zero regions plant the Vernal Iris (*I. verna*) instead.

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AMERICAN IRIS

The gem of the dwarf beardless species is our own Vernal Iris (*I. verna*) native from the hills of Kentucky and Georgia. The roots are wiry and black. The plant makes a very close clump, enlarging very slowly. The short flat leaves are nearly evergreen. Usually, the flower is solitary and only four inches above the soil, rising stemless like a crocus in May. The color is deep purple violet, the standards large, and the falls with a vivid orange throat, contrasting well with the violet color. There are seed capsules, but so near the soil as rarely to be noted; so division in spring is the usual method of propagation. This plant withstands well the heat and drought of summer, but is best left undisturbed for many years. Color forms have been listed, from pure white to various lilac colors, but rarely are they offered. This is the most truly dwarf of beardless species, and deserves very wide planting, a sort of oversize crocus, far more showy and vigorous in northern regions than the bulbous species of the Juno and Reticulata groups of iris. It has no near relatives, but perhaps hybrids could be made.

Cubeseed Iris (*I. prismatica*) is a small swamp species of eastern North America, but it will grow well in any moist border, as is also true for the Siberians. In fact, it is related to the Siberian group, but the stem is partly solid, not wholly hollow as in the true Siberians. The roots are tufted, fibrous, with long slender subsurface stolons like to some grasses. The narrow foliage blends with the grasses and rushes of the swamps. In May-June there is a small lilac flower (at times a pair) on a stem about one foot tall. The capsule is sharply 6-angled, very unlike that of the true Siberians. It is easily grown from seed, but separating the matted stolons of old plants is somewhat of a task. Color forms, from pure white to purple or lavender, are known. In effect, the Cubeseed Iris resembles the California species, and being native it is very easily grown in the eastern half of North America.

Our other eastern dwarf beardless species is the Beachhead Iris (*I. hookeri*, formerly *I. setosa canadensis*), wild on our northern sea-beaches from Labrador to Maine. It may be but a few inches

high, or a foot or more. The small flowers have violet-blue falls, but the standards are but small bristles. It blooms in June. It is curious as our northern representative of a group with the standards almost absent. The Beach-head Iris is very easily grown in the rock garden or in front in the usual hardy border. Seed is at times available, but plants are rarely offered.

The many beardless species of our Rockies and the West Coast are rather tall to be called dwarf, as they stand more than a foot tall as a group. In our eastern states they may not easily be grown, but evidently they are successful in their native range. As their botany is somewhat confused, and a special bulletin for this group is in preparation by the American Iris Society, we omit them for the present.

Arctic Iris (*I. setosa*, or perhaps *I. biglumis*) is similar to the Beachhead Iris, ranging in arctic Asia from Siberia to northern Japan and Alaska. The leaves are broad and sword-like, but short. The June flowers are lilac to deep purple, the standards minute. Seed may be imported, but the true plant is little seen in America.

EURASIAN IRIS

These are a group of dwarfs of central Eurasia, of which the Russian Iris (*I. ensata*, (Fig. 4) or perhaps *I. lactea*) is best known. It ranges from the Caucasus to Japan, in many geographic forms. While the flowers have narrow segments of violet-blue and it looks harmless enough at one foot, after bloom in May-June the foliage makes huge clumps, like to a robust Siberian that had bloomed but little. The capsule is very long and narrow, with six ribs, on a long pedicel. Grow from seed, for spades are broken on trying to divide old clumps. One plant is enough for a small garden. The foliage is nearly evergreen, and unlike most of the beardless species, it thrives in heat, alkali, and neglect. Imported seed of the following species often turn out to be those of *I. ensata*, as it is the most vigorous of all dwarf species:

Hyacinth Iris (*I. ensata* var. *hyacinthina*) (Fig. 6) was found by Farrer in Yunnan and Tibet. The flowers are soft blue, veined brown, with odor of hyacinths. Usually your seedlings are

found to be *I. ensata* or *I. sibirica*, but the Hyacinth Iris is known in this country.

Pilgrim Iris (*I. ruthenica*) (Fig. 8), an alpine relative of *I. laevigata* of Roumania, Turkestan, China and Korea, has one small leaf on the four to eight inch stem and a small royal purple flower in May. The capsule opens at once when ripe (like to viola), so collected seed is rare, but it is offered in European botanic gardens.

Bunge Iris (*I. bungei*) (Fig. 9) from Mongolia has narrow stiff leaves, persisting at their base (as in California species). Flowers are rosy purple and bloom in May at six inches. Evidently it is not in cultivation at present. Nor can we get Inflated Iris (*I. ventricosa*) from northern Manchuria. Nor may we try Thinleaf Iris (*I. tenuifolia*) once wild from the banks of the Volga River to central Asia, a sort of two-inch *I. ensata*, for it is only a botanical record at present.

Now we have three really tiny species from central Japan to Korea. Little Jap Iris (*I. minuta*) from Japanese gardens has stems four to six inches tall, the flowers tiny and yellow, blooming in May. This is in this country as seed and plants and it is the only dwarf yellow beardless species. The Little Jap Iris is very suitable for rock gardens, but with much foliage after bloom. Ross Iris (*I. rossi*) is pale blue to lilac, blooms at four inches, and comes from Korea and Manchuria. It has been in gardens here. The Henry Iris (*I. henryi*) found in Kansu by Farrer, is yellow in flower, but evidently now only in herbariums. There were other tiny species collected in China, but they are not in our gardens at present.

BULBOUS IRIS

We have finished with the usual dwarf beardless species with rhizomes or fibrous roots. Several of the "bulbous" species also are very dwarf in stature. In the Juno group, the "root" is a bulb with persistent, fleshy roots below. Many are tall and leafy, but the Persian Iris (*I. persica*) (Fig. 7) and its kin are as stemless as a crocus, and ask for similar culture. Persian Iris holds its solitary flower at two to three inches. The standards are small, white, tinted lilac, and the falls are dark purple. It blooms in April. The narrow leaves grow after the flower

has faded. Native to Asia Minor and Iran, the Persian Iris is known in many forms and varieties, and is suited to a warm dry spot in the rock garden. Spinster Iris (*I. rosenbachiana*) is from Turkestan. It bears white or violet standards, the falls are tipped dark crimson purple, and it blooms in March-April. Its leaves are more curved than those of the Persian Iris. It is hardy, but rarely seen.

Palestine Iris (*I. palaestina*) from Syria blooms after the leaves are developed, but in winter, so it is not hardy to zero cold. The yellow flowers are close to the earth. Scorpion Iris (*I. alata*) is not hardy to frost (Spain and Algeria), the blue flowers being two inches or more tall. It blooms from October through January. It can be used for a crocus effect in pots or in rock gardens of no frost.

In the Reticulata section some five or more species are crocus-like. They have a true bulb, with no basal fleshy roots. They should be planted as crocus and are almost as hardy. The long four-sided leaves develop after bloom. Netted Iris (*I. reticulata*) (Fig. 10) has deep violet or red-violet flowers four to six inches high and blooms in April. Native to the northern Caucasus and Asia Minor, it is wholly hardy and common in northern rock gardens. There are many color forms, as Cantab, a deep blue. Harput Iris (*I. histrioides*) has deep blue flowers in March, two inches tall, and blooming before the leaves appear. It comes from northern Asia Minor. A variety *major* is listed (Fig. 5). Syrian Iris (*I. histrio*) has light blue flowers at three inches in April among foot-long leaves. It is a native of Lebanon and Syria in the mountains. Christmas Iris (*I. vartani*) has pale lilac flowers blooming in March and again in September below the leaves. It is from the cold parts of Syria, but in zero winters is safest in a coldframe. Danford Iris (*I. danfordiae*) (Fig. 3) of Cilicia and Asia Minor, has yellow flowers two to three inches high, blooming in April-May. Though hardy to much frost, it does not persist long in zero climates. It blooms sparingly and rests two or three years after blooming or is dead from natural causes. It is available in the trade.

Baker Iris (*I. bakeriana*) (Fig. 1), from Asia Minor, has eight ribbed hollow

leaves like to some alliums. The March flowers are deep violet blue with a yellow patch on the falls, and are fragrant. It is rare at present in this country. *I. kolpakowskiana* from Russian Turkestan, has V-channeled leaves, like to a tiny hemerocallis. The flowers are deep purple and bloom in April-May at one inch. It is not at present in our gardens.

DYKESIANA IRIS

The strange group, the Dykesiana, has a spiny corm and two sheathing leaves on the short stem. They are native to Palestine and thrive in lime and four months of drought. They have been in our California gardens and could be hardy to much cold. Jaffa Iris (*I. grant-duffii*) has yellow flowers, spotted purple, blooming at six inches in May. *I. masia* is purple in color; the Black-spotted Iris (*I. melanosticta*) is green-yellow, spotted black, and *I. aschersoni* is green-yellow, edged black. These may be but color variations of the one species, *I. grant-duffii*. Since they are not generally planted, there must be some difficulty in their culture. Apparently they prefer a warm desert.

DWARF CRESTED IRIS

Three small species are crested, but not beardless. Mention is made of our Crested Iris (*I. cristata*) (Fig. 2) and its kin. This walks about by its slender rhizomes, making new plants as it grows. The flowers are solitary, light lavender, and bloom in May at three inches. While growing from seed is easy, increase by division in early spring is simpler; also stem cuttings of the rhizomes can be rooted in sand in early summer. In the

rock garden in hot dry summers the plants wilt badly so provide a moist, humusy soil in part summer shade. There are several color forms, but only the pure white is generally available. A search of our mountains from Ohio to Georgia would provide new color forms. Dwarf Lake Iris (*I. lacustris*) is very similar, but smaller in all its parts. It has deep lavender flowers blooming at two to four inches in May. It is found in moist sands about the Great Lakes and thrives in a moist rock garden. Increase from seed is easy, and seed is at times offered.

Slender Iris (*I. gracilipes*) is native to Japan, but much seen in our rock gardens. The stalk rises from six to ten inches, bearing several May blooming flowers, light mauve to lilac, the falls with a stout crest, like to small butterflies poised for flight. The rhizomes are small in a solid mat, but spring division is easy; or seed grows readily. A pure white form is at times in the trade, and a double sport, pale blue, known as "Blue Rose" is now offered. This Japanese crested species is the only low non-bearded species with several flowers on the stem.

As a review of the dwarf beardless Iris that I have grown (or tried to grow) the top of the list belongs to our *I. verna* with its orange throat, *I. hookeri* with its standards absent, and then little *I. minuta* because the flowers are yellow. The Ruthenica and Ensata groups are foliage plants, like stunted Siberians, while the California groups do not like hot dry eastern summers. Some of the Juno and Reticulata groups bloom with crocus (but not in as great a show), while others must be grown south of our line of frozen ground.



ROBERT L. TAYLOR

Figure 1
Iris bakeriana



MICHAEL CARRON

Figure 2
Iris cristata



ROBERT L. TAYLOR

Figure 3
Iris danfordiae



*Figure 4
Iris ensata*



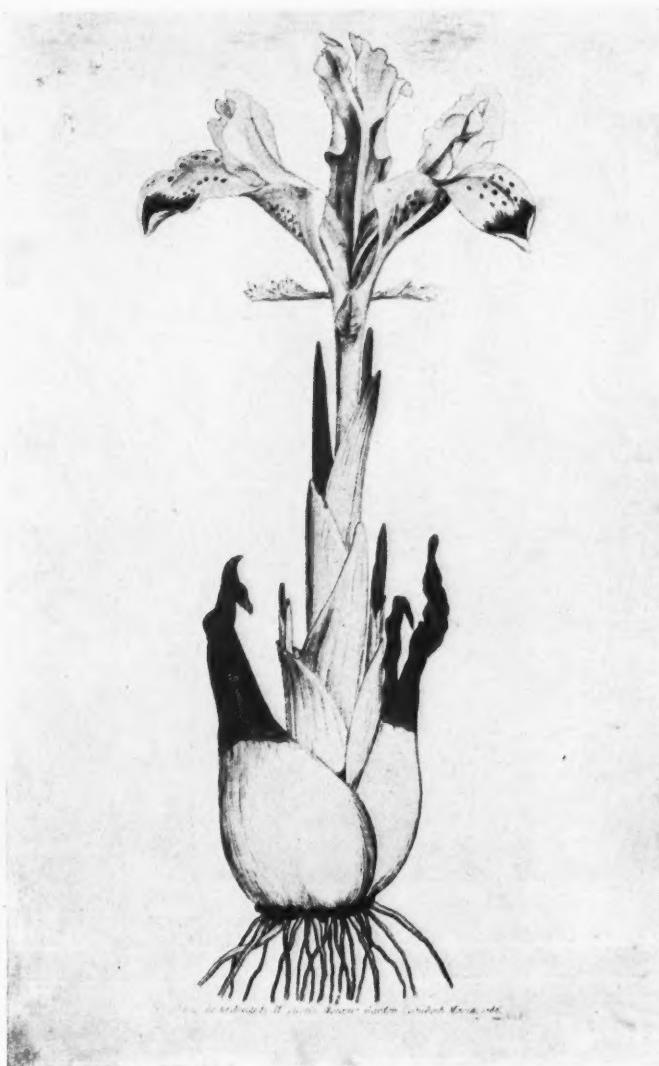
ROBERT L. TAYLOR

Figure 5
Iris histrioides major



LILIAN A. GUERNSEY

Figure 6
Iris ensata var. *hyacinthiana*



*Figure 7
Iris persica*

The first published plate in Curtis's Botanical Magazine



GEORGE C. STEPHENSON

Figure 8
Iris ruthenica



LILIAN A. GUERNSEY

Figure 9
Iris bungei



DONALD F. MERRETT

Figure 10
Iris reticulata



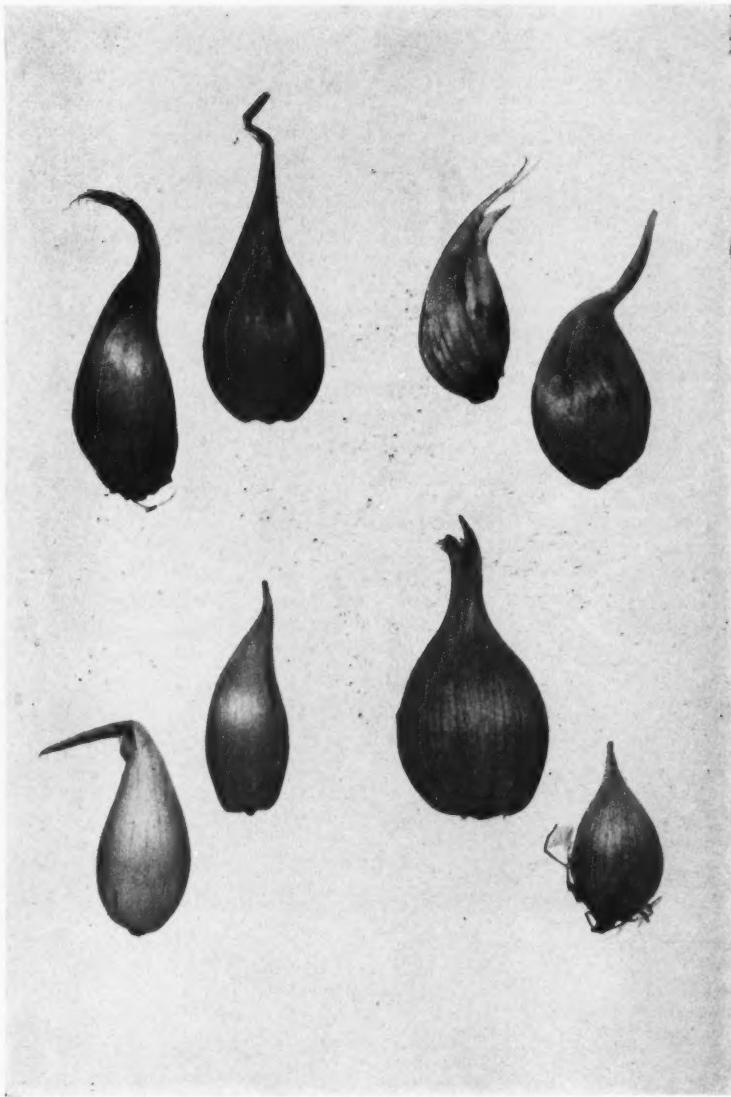
DONALD F. MERRETT ©

Figure 11
Iris unguicularis



LILIAN A. GUERNSEY

Figure 12
Iris urumovi



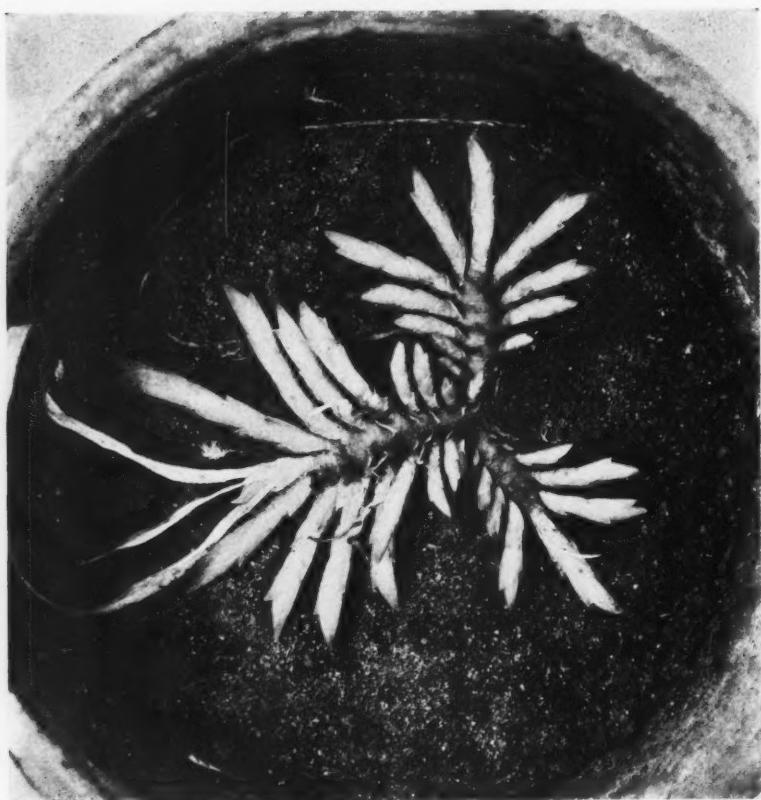
ROBERT L. TAYLOR

Figure 13

Iris histrioides major
Iris vartani alba

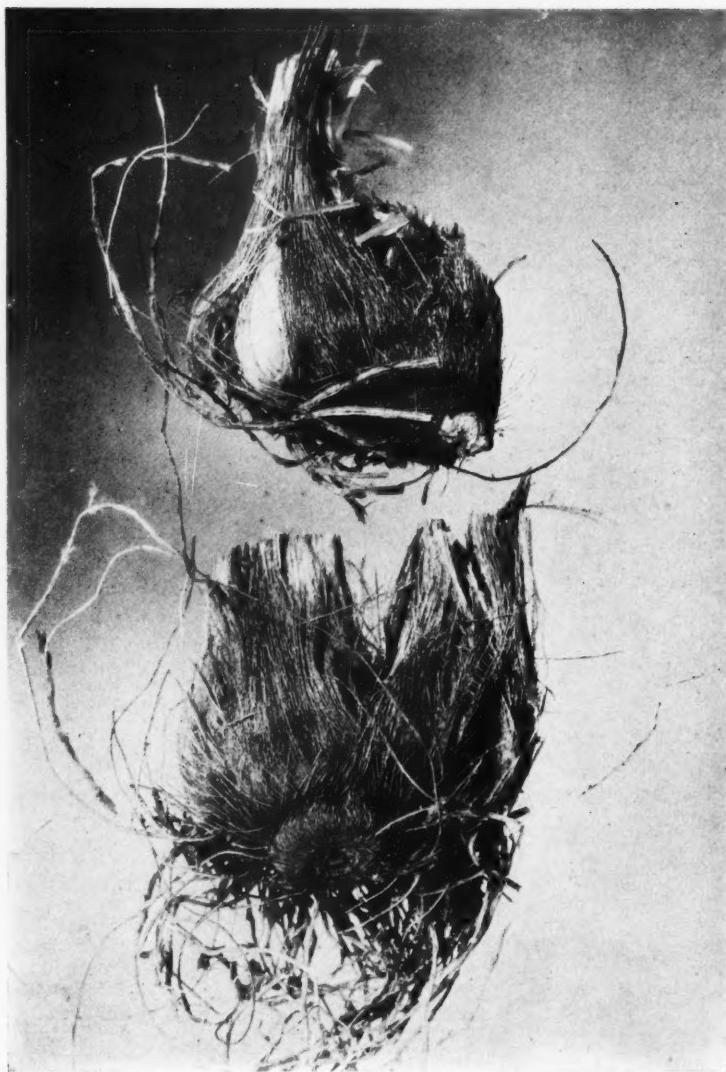
Iris danfordiae
Iris bakeriana

(All natural size)



LILIAN A. GUERNSEY

*Figure 14
Iris lacustris*



LILIAN A. GUERNSEY

Figure 15
Iris melanosticta
Iris grant-duffii



G. HAMPFLER, LONGWOOD GARDENS

A Colvillei Type Gladiolus

Unusual Gladiolus Species

PHILIP O. BUCH

An avocation started over thirty years ago has been most rewarding, not only in the realm of plant breeding, but in correcting many misconceptions regarding gladiolus species. Finding and introducing several unknown species in commerce, thereby providing new plant material for American hybridists' use, was an unexpected pleasure.

Back in 1929, after some five years of amateur hybridizing, the author, through an exchange of a new origination (face up type, then dubbed "alternatus") with the late William Edwin Clark, was introduced to two species, *Gladiolus byzantinus* and *Gladiolus primulinus*. The former required fall planting; the latter, spring, with the garden types. In a few years it was recognized that these two species were "immune" to the then new threat to garden gladiolus—the thrips. The first thought was to develop new thrip-resistant strains, but these two could not be bloomed together for crossing.

After becoming intrigued with these wildlings, other species were gradually sought out for testing and breeding and added to the continually growing collection as they became available or were found, mainly through correspondence overseas. A backyard garden eventually became a stud lot from which, over the years, many hybridists have drawn new blood lines for their own experiments.

As time passed and new experiences accumulated, it was found that most of the summer-blooming African species then available were susceptible to thrip damage. The reason, as deduced, was that they bloomed in the heat of summer, a time and season ideal for the multiplication of the pest. Then, after this realization, began a search for species which would bloom in New Jersey before July, when the thrips usually become active. The hardy Eurasian species seemed to be ideally suited to this purpose. Some of the early European hybrids seemed to fill the bill and, after many years of searching, they, too, were added.

THE EURASIAN SECTION

All Eurasian gladiolus species have been found winter hardy in northern New Jersey. Their native habitats extend roughly below a northerly arc running from Portugal to Poland to Afghanistan and above a southerly arc running from the latter country to Morocco. Because of their habitats, some writers have referred to the group as Mediterranean species. Their native range is from sea level to heights of 7,000 feet or more. The color range of this section is rather limited compared to the color range of the garden types, from pure white to pink or lavender and purple and white, lavender, with the majority in various hues or shades of purple. There are no yellows or pure reds in this section.

A Dutch botanist confided to the author that the so-called blue garden gladiolus were developed from crosses utilizing *G. byzantinus*. In retrospect, this appears possible, since not only that species, but others of the section have a pronounced tinge of blue about the blotches on the lower segments. It may also account for the red-violet and white blotches so frequently seen in such garden types and the fact that they are usually short-lived.

Eurasian gladiolus species must be planted in the fall, generally in October or November. They root very much like spring bulbs, which originate in the same general area, and, likewise, poke through the surface when the early spring sun begins its warming endeavors. In May, June, and early July (in New Jersey), they flaunt their regal blooms, ranging from less than an inch to 2½ inches across. Actually, most of them are smaller than the miniatures we hear so much about these days.

The corms (not bulbs) should be set about four inches deep in a light, well-drained soil, either in rows, if you garden that way, or in groups, in the hardy border or rock garden. They may be left alone for years, while they gradually in-

crease in number; or, they may be lifted after flowering, stored dry during summer, and planted out again in the fall. In regions where alternate freezing and thawing is normal throughout the winter, a mulch to prevent heaving should be applied after the ground is frozen. Early the following year, when the final thawing has arrived, the covering may be removed. Where the ground freezes and remains frozen all winter, mulching is not necessary. Nature generally provides its own insulating material in such areas—snow.

Following is a brief description of the available Eurasian gladiolus species generally winter hardy from around Portland, Maine, to the Great Lakes region, south and west to New Mexico and up the Pacific coast:

G. anatolicus. From Turkish Armenia. Thought to be a selection from *G. imbricatus*, a variable species. Grows to 24 inches, with 2 to 6 purple and white flowers, $1\frac{1}{2}$ inches wide, in mid-May. Its attractively folded lower segments differ from all other species in this section. Has withstood 14 degrees Fahrenheit below zero in New Jersey.

G. byzantinus. Grows throughout southern Europe and northern Africa. One of the strongest of the section, growing to 30 inches, with 7 to 15 light purple, 2 to $2\frac{1}{2}$ inch flowers, with the typical white median line edged darker purple on the lower segments, in early June. Has withstood 35 degrees below zero. In Illinois, Indiana, and Michigan, it blooms from mid- to late May. In California, from mid-March to early May, and in the deep South, in mid-April.

G. communis. From Switzerland. Grows to 34 inches, with 5 to 15 light purple-red flowers, about an inch wide, with the typical purple-edged white median line. Blooms in mid-June. Has withstood 20 degrees below zero. May in California. The flesh colored variant, var. *carneus*, has withstood 16 degrees below zero, and is actually more tender than the type.

G. illyricus. Ranges from the Iberian to the western Balkan Peninsulas. Grows to 18 inches, with up to 10 magenta flowers in mid-June. These are an inch wide and have the typical white median line bordered purple. Has withstood 20

degrees below zero. In the deep South, it blooms early in May.

G. paluster. Grows to 18 inches, with 2 to 7 small lavender-purple flowers having very long lower segments and the typical white line. Blooms early in June and has withstood 20 degrees below zero.

G. segetum. Grows to 33 inches, has 6 to 12 light carmine-red flowers about $1\frac{3}{4}$ inches wide, with the white median lines bordered purple. Blooms in early June. Has withstood 30 degrees below zero. The variant from Iran, var. *Persia*, grows to 27 inches, has 6 or 7 small, light purple flowers with the typical white lines and a bluish tinge, in late May or early June. Has withstood 10 degrees below zero. A white form, var. *album*, grows to 24 inches, is unmarred by color, and is a shy bloomer in early June. Has withstood 16 degrees below zero.

The literature claims several other species in this section but they have not yet been found. *G. triphyllus*, from Cyprus, and several from Iran, have not withstood New Jersey winters. Corms of *G. byzantinus* and *G. segetum* from Tunisia and Egypt have also succumbed here while their European grown relatives go merrily on growing.

THE EUROPEAN HYBRIDS

Some of the earlier European hybrids, when found, seemed to fill the requirements of before-July bloom. It is regrettable that more of them have not been preserved. But what we do have are really worth while, considering the fact that they were created before the large flowered garden types came into being. Some of the twentieth century hybrids have promise, too.

The culture for these hybrids is much the same as that suggested for the Eurasian species. The range of hardiness differs, however, which is understandable, when one considers some of their ancestors came from the Cape region of South Africa. They can be considered winter hardy from Long Island, New York, southward, across the mid-south and up the Pacific coast.

The flowers, by today's standards, would be classified from small to medium, being 3 to 4 inches across, but the color range is more variable. We find among these hybrids pinks and true reds and other tones not found in the Eurasian species.

Colvillei Hybrids. The oldest known gladiolus hybrids, still available, originated in England in 1823. Flowers are still sold regularly in the Covent Garden market in London. Of these, four are still available, if one cares to search for them: var. *albus*, creamy white; var. *roseus*, pink; var. *ruber*, carmine red; and var. The Bride, which is pure white, a sport that originated in Holland about a half century later. Incidentally, all of the first three varieties have a darker line running through the centers of the segments. They all bloom in June, grow to about 20 inches, and have withstood 10 degrees below zero in New Jersey. Flowers are about 2½ inches across.

Herald Hybrids. Originated in Holland; these are the largest flowering early gladiolus, with strong, stiff stems, and flowers comparable to the garden types of today. Several named varieties have been offered from time to time, mainly in reds and pinks, and they have withstood 4 degrees below zero. They, too, bloom in June.

Nanus Hybrids. These are the next oldest hybrids still in commerce, commonly called dwarf, or baby gladiolus. They originated in the Channel Islands around 1855, grow to 15 inches and bear what we call small flowers. The range of colors differs from the older Colvillei Hybrids because a number of different species were involved in their development. There are named varieties available in various shades of salmon, orange, pink, and red, with various markings, but there is not enough demand, so they are sold in mixture by most dealers. Several of the group have withstood 10 degrees below zero in New Jersey, and have been involved in the development of another hardy strain by the author. They bloom in late June in New Jersey, while in the deep South they start in earlier or mid-May.

Tristis Hybrids. One of the most charming is a bigeneric hybrid originated in England, named by the author Homoglad after its parents' genera. This has withstood 10 degrees below zero but must not really like the climate of New Jersey, as it refuses to multiply. It is very fragrant after dusk.

Another hybrid, just released in Holland last year, is Christabel. At this writing it is under test outdoors, (with two

feet of snow above it) and indoors in a pot, but no bloom is indicated as yet. It is said to be pale yellow, while the previously described hybrid is red.

Tubergeni Hybrids. For years only Charm, a pretty rose-pink and white variety, made the grade. It is a small-flowered variety and blooms in early June in New Jersey and in early May in the deep South. It has withstood 10 degrees below zero. Now a soft pink sport of this variety, Warmunda, has been released. This should do as well.

CENTRAL AFRICAN SPECIES

It was thought that some species other than those known as "Cape" species might prove hardy in New Jersey and perhaps might flower early to avoid thrip damage. Of those subjected to over-wintering tests outdoors, these succumbed: *G. cooperi*, *G. quartianus*, a var. Sudan, *G. psittacinus*, and *G. crassifolius*. *G. hookeri* withstood 16 degrees below zero, but was frozen in bloom the following November. This has bloomed at Memphis, Tennessee, and is probably more suited to mid-southern or west coast culture. The *quartianus* type of commerce has never bloomed here, but has bloomed in Virginia in November and in the deep South in October. *G. crassifolius* had bloomed here the previous year in late September and in August in southern California. These three species should prove hardy in the mid-South.

Both *G. dracocephalus* and *G. primulinus* withstood 16 below zero and bloomed, but at their normal blooming periods, August and July, respectively. *G. dracocephalus* blooms in early June in the Deep South.

Naturally, hybridization has been going on for several years, and the production of hardy, early blooming gladiolus hybrids has been accomplished. One group of new hybrids will be introduced shortly, others are being propagated or are still under test. Strange new forms and colorings have been produced, but whether gardeners will accept them must yet be proven. Veined flowers in various colors and combinations are in existence in reminder of the Mourning Iris, *I. susiana*. At the opposite extreme, pure colored flowers without any markings also exist.

If one is accustomed to combating thrips, a number of eastern African species are available for the summer garden:

G. cooperi. Grows to 60 inches and produces an occasional side spike. Its flowers are yellow with sparse, fine red lines. Blooms in early August. Pinkoop, a hybrid propagated by the author, has a salmon-pink ground color, otherwise, very much like the type.

G. hookeri. Tall, to 60 inches and bears 14 to 20 large scarlet flowers, with orange on the lower segments. This produces the largest cormels ever seen by the author, up to an inch in diameter; on the longest stolons, up to a foot in length. In a compatible climate this could really spread. It blooms very late, October or November, and is not advised north of Virginia.

G. melleri. This sends up its flower spike first, with pink to flame flowers, the leaves appearing later. Has not yet bloomed here, but should be a summer bloomer. In northern Nigeria it blooms from May to July.

G. psittacinus. One of the progenitors of our garden types, grows to 30 inches and bears 8 to 12 yellow flowers, heavily lined red. Blooms in August. Two new varieties from Rhodesia are under test.

G. quartinianus. A variable species, generally mottled or streaked red and yellow, suited better for the mid-south because of its late blooming. Investigations by the author brought out the fact that this is the most widespread of any gladiolus species, and with different descriptions in almost every locale. Some day the botanists responsible for correctly naming these species will, undoubtedly, come to the conclusion of this author: *G. quartinianus* as described from various habitats are really different species, perhaps related. Two different varieties have been successfully grown by the author: Sudan. Grows to 36 inches. Its flowers are similar to those of *G. primulinus* in shape, but are double the size. A pale yellow ground is so thickly overlaid with fine red lines that the flower appears tawny from a distance. It has a clear yellow blotch. Kivu. This was collected for the author at a height of 7,000 feet on the shores of Lake Kivu in the Belgian Congo. This has more reddish color overall. It has already produced some unusual hybrids but seems difficult to propagate itself. Both of these

varieties bloom here in late July or early August.

In the deep South and in southern California practically all of the African species named above, and the European hybrids, are winter hardy. All will stand light frosts, but if unusually cold weather is forecast, such as occurred during the past winter of 1957-58, a mulch of dry straw should be provided to protect the foliage. This should be removed as soon as the weather becomes clement again. In Florida and other "sun and sand" areas, mulching the surface of the soil may be required to conserve moisture and to permit corms to mature.

SOUTH AFRICAN SPECIES

Most of the dainty gladiolus species from the Cape of Good Hope region may be grown outdoors only in frost-free areas, but some will stand as much as ten degrees of frost (22 degrees F.) for short periods. In other areas a cool greenhouse is a necessity. Even a coldframe is useful in some parts of the South for the first season, as they must be grown from seeds, excepting *G. tristis*, which is generally available in corms. Individuals are not permitted to import gladiolus corms from any part of Africa, so whatever is imported must be in seed form. All require fall planting, as they are winter growers, even in this hemisphere. They dislike high temperatures and wet feet, and should be dried off after flowering in late winter or early spring. The southern gardener who can grow these wildlings will be the envy of northern gardeners, for many are fragrant by day or by night or both. With these and some of the larger African and even Eurasian species, a southern hybridist could have a ball, for in some sections of the South they forget their natural blooming time and actually bloom close enough together to be crossed directly without the need of storing pollen.

G. alatus. Grows 12 inches high and bears 5 to 10 fragrant turkey red flowers, banded with apple green. Blooms late February in southern California.

G. blandus. Grows 20 inches high and bears 7 to 10 white or pale pink flowers, sometimes marked maroon. Most variable. Blooms in June, and has possibilities in a mild climate.

G. brevifolius. Grows 24 inches high and bears 4 to 12 pink or lilac and

white flowers. Produces a single leaf after blooming. Has bloomed in the fall in southern California.

G. callistus. Grows to 18 inches and bears 8 to 12 pale pink flowers, with a faint fragrance. Blooms early in March in southern California, in April in a northern greenhouse.

G. carinatus. Grows to 24 inches and bears lavender-blue flowers, marked yellow, very fragrant. Flowers in May at Kent, England.

G. carmineus. Grows to 18 inches and bears 5 or 6 transparent carmine flowers. The foliage appears after it blooms. Blooms in fall in southern California.

G. cuspidatus. Grows to 3 feet and bears 4 to 8 white or pale pink flowers with white-centered purple blotches. Blooms in May in southern California.

G. gracilis. Grows to 20 inches and bears 2 to 5 pale lilac-blue fragrant flowers, marked yellow. Blooms late January in southern California.

G. grandis. Grows to 30 inches and bears 2 to 6 brown-marked pale yellow flowers; these turn grayish at night and emit a marvelous perfume. Blooms in July in southern California.

G. hirsutus. Grows to 20 inches and bears 3 to 6 deep pink flowers, with white stripes. Very fragrant. Blooms early March in southern California.

G. odoratus. Grows to 30 inches and bears 6 to 16 maroon flowers, marked with cream and brown, and fragrant. Sends spike up first, the leaves, later. Blooms in fall in southern California.

G. orchidiflorus. Grows to 18 inches and bears 4 to 6 fragrant, greenish- to yellowish-purple flowers.

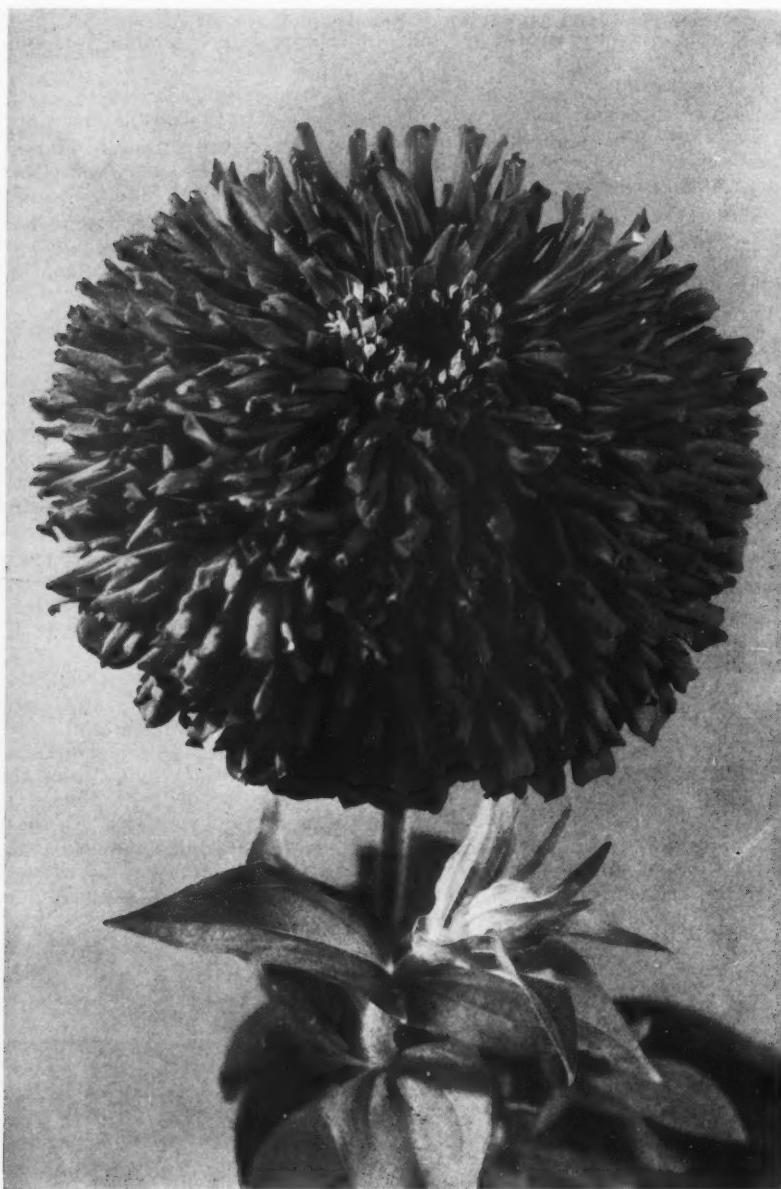
G. permeabilis. Grows to 24 inches and bears 6 to 12 variable, fragrant flowers which may be from white to pale pink to orange-scarlet, some marked chocolate brown.

G. pillosus. Grows to 20 inches and bears 3 or 4 red-lilac flowers, slightly smaller than those of *G. gracilis*, and at the same time.

G. tenellus. Grows to 18 inches and bears 2 to 5 fragrant, creamy flowers, tinged lilac.

G. tristis. Grows to 30 inches and bears 3 to 6 creamy yellow flowers with varying brown spots. Fragrant after dusk. Stands shade and blooms early April in the south, February in southern California, March at San Francisco. Var. *concolor*, called by some *G. concolor*, grows to 30 inches and bears 3 or 4 pale chartreuse-yellow flowers, nocturnally fragrant. Blooms with *G. tristis*.

With all this material now available, entire new races can and should be developed. New combinations are now possible, particularly in the South and on the Pacific Coast. Young gardeners will do well to consider hybridizing among these species—to devote a lifetime to it. An unusual opportunity is now beckoning—new challenges to man's imagination, to be accomplished by the serious gardener by way of one of the most satisfactory avocations known—the hybridization of plants.



ALL-AMERICA SELECTIONS

Zinnia Blaze

All-America Annuals

W. RAY HASTINGS*

What are the All-America Selections? How do they operate and how do they provide the important horticultural releases each year?

First, we are reminded that there are plant breeders around the world. They are using the best varieties and strains already in commerce for hybridizing. Selfing, crossing, double crossing, back crossing, treating with X-rays, nuclear rays, drugs and chemicals, as well as making and truing selections, provide plant material which may be superior to present varieties or may answer a desirable new garden purpose.

Whether it is for size, vigor, uniformity, color, floriferousness, or for drought, heat, cold or disease-resistance, the plant breeder works for something new and desirable. His new variety must be different or distinctly superior to others of its kind and type if it may be recommended or may become popular with gardeners.

Extensive promotion by a large seed firm could and sometimes did call public attention to a new introduction. If it proved desirable and perhaps widely adapted, other leading seedsmen grew it and offered it. After several years such a new variety might become a standard variety, listed in the seed catalogues and by seed dealers for convenient local purchases. Many good varieties were lost for lack of promotion. And, the cost of promotion was frequently, if not usually, more than total sales of a new introduction.

*W. Ray Hastings of Harrisburg, Pennsylvania, is executive secretary and treasurer of the All-America Selections, an organization sponsored by several seedsmen's associations for the operation of competitive trial grounds and trials for the introduction and evaluation of new annual flowers and vegetables.

Some of the new varieties were developed from simple crosses and then selected for several to a number of years for trueness to a type and color. Sports, natural mutations, were another means of obtaining new varieties.

How were we to evaluate them? Reliable seedsmen were anxious for novelties but were wary of them until checked in their own trial grounds or sent to several good customers for their reports. Only a few seed firms had trial grounds of their own and there was but little flower seed breeding or extensive growing done in America before World War I.

With European sources disrupted during and following that war, demand and necessity seemed to create extensive growing of flower seeds, as well as more vegetable seeds at suitable places in America. Foundation or planting stocks were "run down" and seed growers, here and abroad, had a rebuilding job of saving planting stocks only from the best and truest plants of each variety. Then came improvements, new selections, new strains and new varieties from America and from abroad.

ORGANIZATION

In 1932 at Atlanta, Georgia, the Southern Seedmen's Association endorsed, and formed a committee to provide for, the testing of proposed new varieties before introduction. This included both flowers and vegetables. We used available general trial grounds and started a few in sections not represented but where resident judges and institutions or firms had the confidence of the seedsmen. All America Selections were started with ten flower and ten vegetable judges, who



ALL-AMERICA SELECTIONS

Cynoglossum Firmanent

composed the committee or council. These have been increased gradually to twenty-six for flowers and twenty-three for vegetables.

Plant breeders, seed growers and introducers from around the world were solicited for trial entries. New varieties theretofore had been kept secretively until introduction. There were 250 entries received the second year of trials.

The chairman, later executive secretary [with the annual election of officers and directors, and incorporation as a non-profit horticultural, educational institution] receives all entries and sends equally divided samples to each judge.

Entries are given code numbers only for source and priority identification. Each judge is responsible for his trials and their protection. All-America Selections trials are open to everyone for inspection, however, noting and photographing during the growing season.

On annuals, each judge has two years in which to get a fair and indicative trial of each entry. Entries are requested at least two years before any expected commercial distribution. Previous distribution would disqualify an entry for award. News value and cooperative promotion must be provided.

It is usually known after first year trials whether an entry has a chance for award. Award points may be voted by each judge according to his evaluation. Total award points determine any award, such as bronze, silver or gold medal. Regional or special purpose "recommendation" may be given without actual award. If a judge fails to get a fair trial the first year, he is sent another sample for second year trial, so possible award points voted the second year by one or more repeat trial judges may bring an entry into an award class or qualify it for a higher award.

There has never been a satisfactory score card for judging varieties of flowers or vegetables. We shall confine this article to flowers reproduced from seeds, most of which are annuals or are treated as such.

There are several types or classes of petunias, zinnias, marigolds and other flowers. We can hardly score one flower against another kind nor one class against another. All have their uses and desirabilities. It would be unfair or unrealistic to judge the value of a dwarf

French type marigold against a large mum-flowered African type marigold. Comparisons are made with the nearest or most similar varieties already in commerce.

AWARDS

If a judge believes an entry is sufficiently different to be given a new variety name, rather than perhaps an "improved" strain, and he believes it worthy of introduction, he may consider voting it award points. If recommended for introduction but perhaps not for award, he may vote it one or two points. If he believes it is worthy of bronze medal award, and but few receive higher awards, he may vote it three or four points. If he believes it very superior and particularly desirable, he may recommend a silver medal. For an outstanding horticultural achievement, he can recommend a gold medal. All these considerations are given according to the entry behavior and performance at this trial location and under his soil, atmospheric and climatic conditions.

For minimum award consideration by the nine AAS directors, elected by the judges, an entry needs over half the judges recommending it and a total of at least two and a half award points average from all reporting judges. For silver medal award, two-thirds of the judges must recommend it and vote an average of three and a half points from all the judges. For gold medal award, three-fourths of the judges must recommend it and vote an average of four and a half points from all of the judges. The Directors present their award recommendations to the open Council meetings for acceptance or rejection.

There hasn't been a gold medal award since Fire Chief, the first red petunia, introduced in 1950. One should rate awards however, for the particular year and previous introductions of its kind. Fire Chief was the first real red or scarlet-red petunia. Plant breeders used it immediately to produce other and superior reds. In 1952, a first generation or true hybrid red multiflora petunia Comanche, considerably superior to Fire Chief, was introduced as a bronze medal winner. Again in 1957, a still superior and richer colored Red Satin petunia received only a bronze medal at introduc-



ALL-AMERICA SELECTIONS

Marigold Glitters

tion. These were all with plain petalled, medium sized flowers.

This red "blood" also was successfully bred into the larger and frilled flowered hybrid grandiflora petunia Fire Dance, with a flashlight yellow throat to enhance its brilliance. It received a bronze medal award as did several others of the new hybrid grandiflora class. Ballerina of salmon, Prima Donna of rose-pink, and the 1958 winning light salmon-pink Maytime are representative of this highly prized new group of vigorous bedding petunias.

Therefore, a bronze medalist may be and usually is more desirable than a previous silver or gold medal winner of similar type and color. Unless the year of award or introduction is considered, one should not be too concerned about the particular medal award. If a new variety is recommended as an All-America Selection, one may be assured that it is generally believed distinct, worthy and the best of its coloring and class to date.

While a new color may be desired for certain garden or cutting purposes, such does not imply that it is the choice of all colors in its flower class. People have different color preferences and arrangement designs. The first pink or pink shade in an alyssum, perhaps a heather pink, would be considered of particular value. We might then hope for a deeper color, possibly rose-pink, to be developed later. Meanwhile, we shall honor and plant the first pink alyssum, just as we appreciated Lilac Gem until Violet Gem and Royal Carpet were created.

Some day a plant breeder may produce a white marigold, a yellow sweetpea, a real blue petunia or snapdragon. All-America Selections encourages those quests for horticultural achievement and if the subjects are meritorious and desirable, will award and publicize those new varieties as widely as possible to assure successful introduction. Meanwhile, there are improvements in present color ranges, for clearer colors, more vigorous and uniform plants, earlier and longer flowering, more flowers, disease and weather resistance, for more interesting and satisfactory gardening.

A number of entries, although non-winners, are still worthy of introduction. AAS does not disparage them in any way. It does wish to keep its award standards

high so gardeners may always depend on its selections as the newest and best of their kinds and colors to date. And, it is noted that, from results of the trials reported in detail to their entrants, most of the entries are never introduced. That is a distinct and economic advantage to all concerned.

REPORTING

Reporting each judge's description, comments and evaluation of an entry to its owner provides the cheapest and perhaps best information he could get on the merit of the variety. He finds how it performs under the various conditions over America and is guided on whether it is worth introducing although not awarded. On the other hand, judges often suggest methods of further breeding and selection for future re-entry, if the variety shows particular promise.

Such reporting provides valuable information to a breeder. That is a reason why federal and state institution plant breeders, as well as commercial and amateur hybridists, enter their promising new varieties and "lines" in the AAS trials.

It was reported that an AAS award to a state institution flower entry was responsible for not only the retraction of an appropriation cut but also an addition of many thousand dollars to further its plant breeding work. This award was for the development of rust-resistant snapdragons when the disease had about ruined the market for snapdragons. Now snapdragons are back in the "big four" most popular garden flowers and with much better plants, blooms and colors than ever before. F₁ snapdragons for garden as well as greenhouse planting are now on the march, with a full range of colors on exciting plants among the 1958 entries.

Breeding and producing more interesting, attractive and satisfactory flowers for the greatest of avocations or hobbies, home gardening, is one of the most satisfying occupations a person can choose. But with a million new homes a year and a million families to make them livable and attractive, it is not enough to produce finer varieties. The public must know of them, desire and plant them.



BODGER SEEDS, LIMITED

Cosmos Sensation Radiance

When AAS was founded in 1932, there were but a handful of garden editors or columnists. The Garden Club movement was beginning to grow. Flower shows were developing. People seemed to have more time and become more interested in their homes and gardening.

Press releases on the new All-America Selections were sent to the home and garden magazines, farm journals and the larger newspapers. The press carried the news of better gardening to the public. Garden columns and pages grew. Garden clubs had interesting new subjects and varieties to plant, discuss and exhibit. Radio broadcasters began to announce the new winners. Now, television shows them.

We presently have several hundred garden editors and writers. Most newspapers have garden editors or writers assigned to garden subjects. AAS thus serves the press. It is of special service to the garden seed industry which supports it through voluntary subscriptions. But, the benefit is primarily for the gardening public. The gardener, novice or experienced, is assured of meritorious varieties if he or she looks for the certification mark of AAS on the packets or in the catalogues. Only the award winners can carry that registered mark or name.

WINNERS

We mentioned that newer and better varieties displace some of the older winners, as is natural, however, a number of the earlier winners remain as the best

and most popular of their kinds. Probably all have been used in hybridizing towards the creation of further improvements.

Examples of winning varieties which remain the popular choice of their kinds include Midget Blue ageratum, Royal Carpet alyssum, Rosalie antirrhinum, McKana Giants aquilegia, Light Blue (early giant) aster, Toreador (cockscomb) celosia, Jubilee Gem cornflower, Pink Queen cleome, Fiesta (Klondyke) and Giant Sensation cosmos, Firmament cynoglossum, Westwood Beauty dianthus, Indian Summer (annual) hollyhock, White King larkspur, Giant King (annual) lupine, Fairy Bouquet linaria, Glitters (double) and Naughty Marietta (single) marigolds, Pearly Gates and Blue Star morning glories, Golden Globe nasturtium, Ballerina and Red Satin petunias, Roggli Swiss Giant pansies, Salmon Glory phlox, Blue Bedder salvia, Cuthbertson (spring flowering) sweet-peas, Torch tithonia, Floradale Beauty verbena, Blaze (giant cactus) zinnia.

Others might well be named as well as new types of flowers containing additional and very desirable colors which continue to enhance garden interest and satisfaction.

With assurance of successful introduction through widespread cooperative promotion of the seed industry, together with the press, radio and television, it is to the distinct advantage of plant breeders from around the world to enter their prospective varieties in the All-America Selections trials.



A section in Entertainers Garden—one of four recently completed Home Demonstration Gardens in the Los Angeles State and County Arboretum

Los Angeles State and County Arboretum

The First Ten Years

GEORGE H. SPALDING*

In Southern California, the San Gabriel Valley is one of the more favored areas in the nation, climatically speaking. The Los Angeles State and County Arboretum (LASCA) is located on the northern edge of this valley, just east of Pasadena, in the beautiful city of Arcadia, just twenty-five minutes from the center of downtown Los Angeles.

The hundred and twenty-seven acres comprising the Arboretum were the heart of the famous Rancho Santa Anita, once part of the Mission San Gabriel lands. The first private owners were Hugo Reid and his Indian wife, Donna Victoria, a woman of charm and culture, to whom the Mission fathers had given the land in appreciation of her house-keeping services at the Mission. The Rancho had several owners between 1841, when the Reids finally received title to the property, and 1875 when it was purchased by the fabulous E. J. "Lucky" Baldwin. Baldwin had extended the holdings to more than sixty thousand acres at the time of his death. Between 1907, when Baldwin died, and 1947 the estate was divided among his heirs and a goodly portion, of it sold and subdivided. The hundred and eleven acres of the original State and County purchase were the final section left undeveloped and plans had already been drawn for a subdivision of this area.

In 1948 Los Angeles County was the only major metropolitan area in the United States that lacked an arboretum or botanic garden. The Southern Cali-

fornia Horticultural Institute, one of the oldest horticultural organizations in the area, recognizing the need for such a scientific and educational institution, had set up an active arboretum committee. The area around Los Angeles was thoroughly investigated and the present location of the Los Angeles State and County Arboretum selected. The committee then convinced State and County officials of the value of an arboretum to the community and in 1948 it was purchased jointly by the State and County, just in time to save it from subdivision.

The site contains one of the few natural bodies of water in Southern California and is set against the spectacular background of the San Gabriel Mountains. In addition, it has within its boundaries three old buildings, reminders of its historic past. Two of these buildings, the "Queen Anne Cottage" and the coach barn, are now restored to the gaudy glory of their Victorian origins. The park-like area between these two buildings is a favorite haunt of the famous Baldwin peacocks. A few pair imported by Baldwin in the late 80's have now gone wild and increased to a flock of a hundred and fifty birds. The third building, Hugo Reid's adobe, is in the process of being restored and should be completed in 1959. The historical preserve where the buildings are located is in the center of the Arboretum on the south bank of the lagoon. It gives a unique opportunity to show two important phases of California history; the simple agrarian life of the "Hide and Tallow" era, the early 1800's, and the lavish mode of living which followed the discovery of gold in 1849. Around this

*George H. Spalding is Superintendent of the Los Angeles State and County Arboretum and has enjoyed seeing its rapid development during the decade of his stewardship.

fragment of the past is developing one of the most modern arboreta in the World.

In 1947 the California Arboretum Foundation, Inc., a non-profit organization, was formed to administer the Arboretum for the County. The Foundation Board of Trustees was composed originally of the members of the Southern California Horticultural Institute Arboretum Committee augmented by other public spirited citizens with wide horticultural and historical interests. This Board formulated the master plan and began development of the grounds. It also set up a list of nine objectives which is the guide for development of the Arboretum. Under these objectives the Arboretum is to serve as:

1. A horticultural center for Southern California.
2. A center for the introduction, testing and improvement of plants adaptable to Southern California.
3. A gardening school for training gardeners, garden superintendents, propagators and other skilled personnel.
4. A center of research and scientific study, working in collaboration with educational institutions and, with Federal, State and County departments of agriculture.
5. An information center maintaining a complete catalogue of all plants cultivated in Southern California, where specimens can be readily identified, and practical advice given on planting, propagation and cultivation.
6. A library and herbarium.
7. A publication center for bulletins, books and pamphlets of horticultural, botanical and historical interest.
8. A preserve of early California architecture and authentic historical gardens.
9. A bird sanctuary.

The Foundation is also responsible for the fine orchid collections which the Arboretum has and for two new greenhouses to house them. Foundation members take a keen interest in the Arboretum and donations of books, botanical prints, plants and equipment for research are received from this source.

In 1953 the interest and support of a

progressive County Board of Supervisors was demonstrated when it voted unanimously to create a County Department of Arboreta & Botanic Gardens to assume management of the Arboretum, leaving the Foundation free to devote its energies to those activities of benefit to the Arboretum which could not be carried on with tax funds. The rapid progress being made in development is largely a result of this enlightened decision.

A good master plan is a prerequisite for a successful arboretum. In developing the plan for the Los Angeles State and County Arboretum it was decided to use geographical and ecological groupings rather than the plant family groupings commonly used in older arboreta. The four major areas of the Arboretum are devoted to plantings from the four areas of the world which have a climate similar to this section of Southern California—South Africa, the Mediterranean, Australia and Central and South America.

The plantings in general are approximately one half to two-thirds completed. The Australian section already contains a collection of more than three hundred species and varieties of *Eucalyptus* and approximately two hundred species of *Acacia*, to mention two of the major groups. In the South African section the meadow of composites attracts many visitors and the *Aloe* collection is outstanding. The South American and Mediterranean sections have lagged due to storm drain construction, which was completed last year and rapid progress will now be possible in the area.

In addition to above mentioned sections there are special gardens and display areas. The Oriental section contains those plants from all sections of the Orient which will grow here. The Herb garden is one of the largest in the country and its fast development is largely due to the active interest and support of the Southern California Unit of the Herb Society of America. A Jungle area, located on the north side of the lagoon, is a major attraction for young and old. In it many of the scenes for the Tarzan and other jungle movies have been filmed. The Palm and Bamboo section contains over sixty kinds of bamboo and an excellent representation of the palms which can be grown in this area.

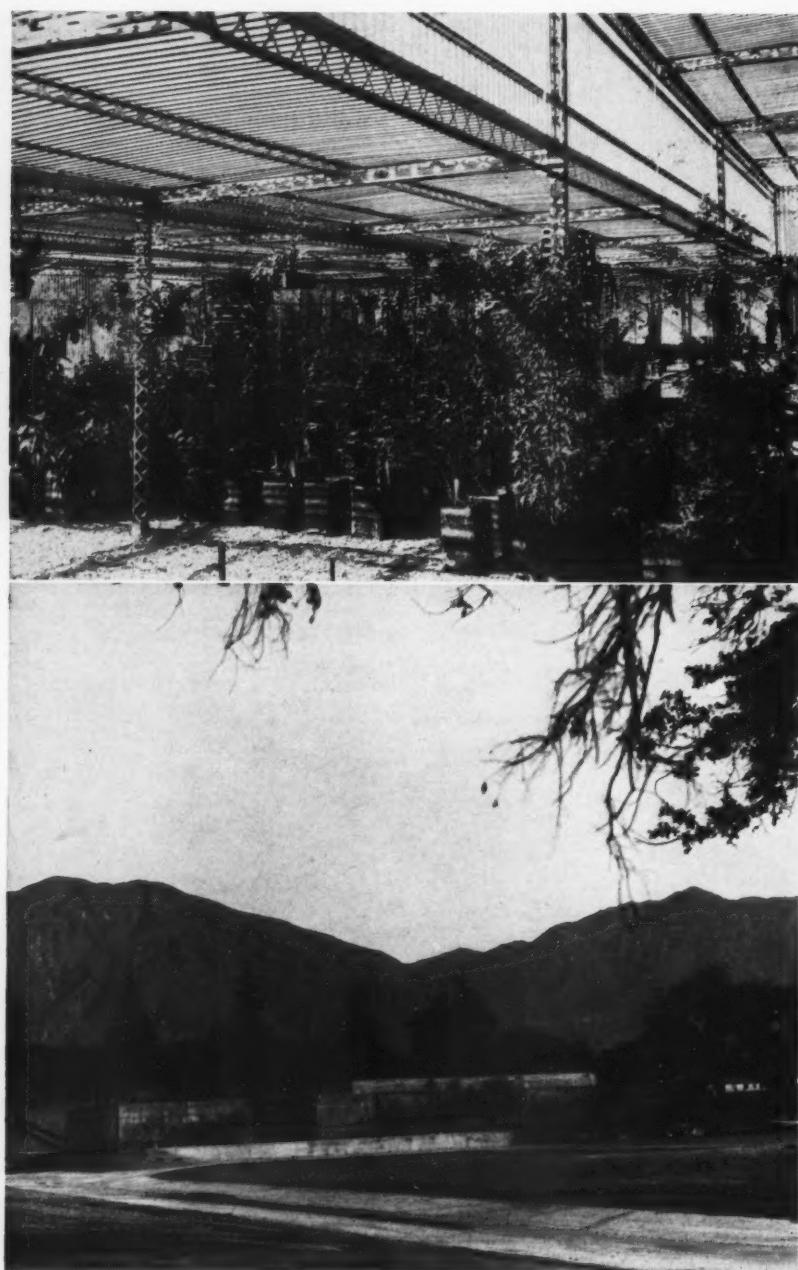
On Tallac Knoll, a small hill in the



The Arboretum Herb Garden developed in cooperation with the Southern California Unit of the Herb Society of America.

The Arboretum trade mark, Phoenix dactylifera, (foreground) Washingtonia palms as seen in a view across the lagoon.





Interior and exterior views of the aluminum lath house



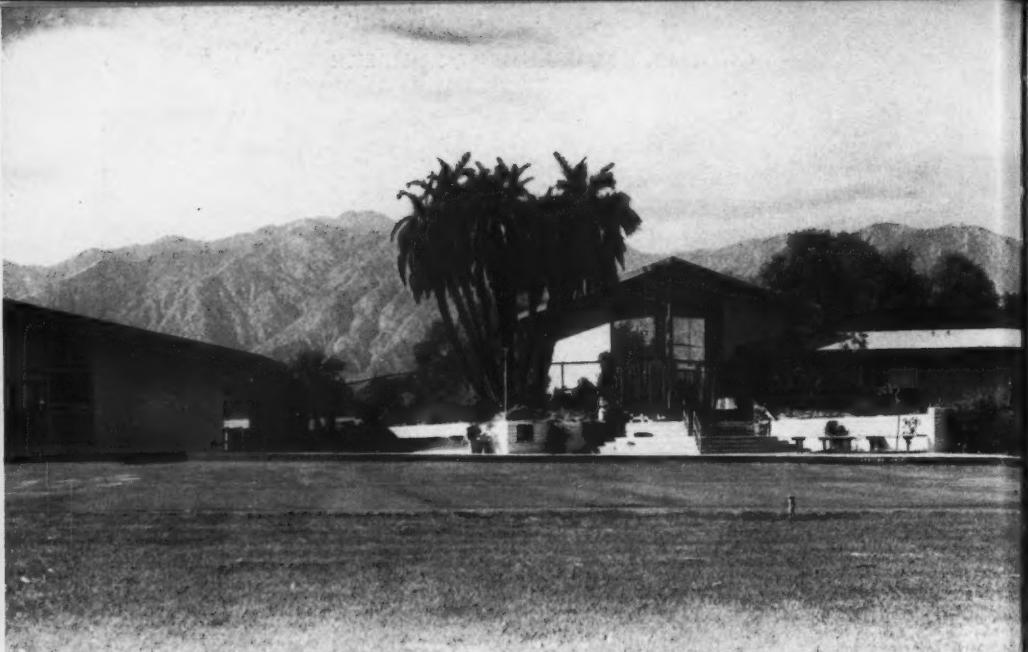
A portion of the lath house and nursery area

southwestern corner of the Arboretum, are the beginnings of an Economic plant collection, an embryonic Flowering Tree collection and one of the finest collections of ornamental figs in the United States. At the crest of the knoll is a Tropical garden for those plants which are tender in this area. Orchard heaters are provided here for winter protection. The beginnings of a Biblical garden are immediately adjacent to the tropical garden. A new addition this year is a garden devoted exclusively to roses developed by Southern California rose breeders.

During the past three years an active building program has begun to develop. The first greenhouse of the propagating range was completed two years ago. It is 34 x 100 feet, of aluminum construc-

tion, and heated by forced air. The head house contains the most modern equipment, metal potting benches, steam generator, etc. In addition, there is a well-equipped plant records office with label making equipment, seed cleaning equipment, and ample room for files and storage. Complete records have been maintained on all plant material and seed received since the first seed was planted in 1949. Last spring the second greenhouse unit was put into operation with improved forced air heat and humidity, all electronically controlled.

The administration building, occupied in November 1956, contains offices, small lecture hall, and temporarily, the library. It is already inadequate and plans have been completed for a new wing which will house library, herbarium and lec-



The new Arboretum administration building and gatehouse

ture rooms. A modern service building has just been put into use containing up-to-date facilities for fertilizer and tool storage as well as special screened compost bins and large soil mixing area, in addition to garage and shop.

In 1956, completion of the gatehouse with adequate turnstiles enabled the Arboretum to be opened to the public on a seven-day-a-week basis. Attendance has doubled each year since it has been open and it is expected that attendance this year will exceed a quarter of a million. The grounds are open daily for pedestrian traffic and, in addition, jeep train tours, conducted by trained guides, are available on regular schedules weekends and by appointment during the rest of the week. The trains are furnished and maintained by California Arboretum Foundation as part of its service for the Arboretum.

Education is one of the two main functions of an Arboretum. Our program, started in 1956, is expanding in a phenomenal manner. This expansion is entirely due to the tremendous demand by the public for classes in Home Land-

scaping, Home Gardening, Plant Identification, Orchard Culture, Botanical Sketching and Nature Study, to mention a few. Courses for Juniors are not neglected either, and over a hundred and seventy children were enrolled in the various courses offered during the past year. Adult enrollment since 1956 has exceeded two thousand.

The second main function is research, both fundamental and applied. Most of the fundamental research will be done with grants from various sources and is just getting under way. The testing and introduction of new plants from all over the world has been carried on for ten years and two new plants of particular value for Southern California have been introduced this year. Several more are ready for dissemination and will be introduced shortly. The large collections of *Eucalyptus*, *Acacia*, *Callistemon* and other bottle brush groups, *Erythrina* and South African bulbs will provide a rich source of material for plant breeders and for critical taxonomic studies of many genera of plants.

Forest and brush fires do tremendous

damage each year in Southern California. A program in cooperation with County and State forest services is under way aimed at locating and testing plants with a high degree of fire resistance for use in replanting burned over areas. To date the genus *Cistus* appears to offer several promising species. Other genera are also being tested.

Addition of a plant pathologist and an entomologist will give impetus to research in these fields. One of the first pathological problems to be studied will be the oak root fungus which is ravaging the fine old Coast Live Oaks, so much a part of our native landscape. Work is also being carried on with plant hormones.

In Southern California considerable differences in maximum-minimum temperatures are not uncommon within very short distances. To improve LASCA's testing and introduction program several test stations in areas of different climatic conditions are planned. The first of these, located on the Mojave Desert in the Antelope Valley near Palmdale was placed in operation a year ago. It has proven highly successful and a second test station on the ocean near Playa del Rey is planned to go into operation later this year. In addition, the Lux Arboretum in Monrovia, which has been a part of the Arboretum for several years, provides a completely frost-free test area.

On July 1, 1958, the Department of Arboreta & Botanical Gardens assumed administration of the beautiful Descanso Gardens in La Canada, California. See,

The National Horticultural Magazine, Volume 35, Page 35, January 1956.

A "first" of major importance was achieved at the Arboretum on May 24th when four Demonstration Home Gardens were opened to the public. These gardens, sponsored jointly by California Arboretum Foundation and Sunset Magazine, were designed and built to help home owners discover the wonderful world of living in and with their gardens in Southern California. The words HOME and DEMONSTRATION are keys to how and why the gardens were designed and built. First, they were planned for the homes of real people. Second, they were designed to demonstrate how to use hundreds of new and old building materials, as well as new plant introductions and old plants in new settings. These gardens are a demonstration of many ideas rather than a single approach to garden layout and design. They are planned for flexibility. Furnishings and plants will be changed by the season; structures may be altered, remodeled, rebuilt—to try out new ideas and new materials. These gardens are proving tremendously popular.

Ten years ago, a small group of civic-minded people had an idea that they felt would improve and benefit Southern California and Los Angeles County in particular. The Los Angeles State and County Arboretum is the realization of that idea, and illustrates in the finest way how local government and private capital and energy can work together for the benefit of the whole community.



ROBERT L. TAYLOR

A typical single Camellia sasanqua

Sasanqua Camellias, Their Introduction, Culture, and Use

FRANCIS DE VOS*

The first time I saw sasanqua camellias growing was seven years ago at the United States National Arboretum, Washington, D. C. They had just finished blooming, but their ever-attractive glossy foliage caught my eye and aroused my curiosity. The next autumn, after reading the camellia literature, talking with camellia enthusiasts, and seeing sasanquas in flower, I was convinced that this long-neglected species deserved wider use in our gardens. The copious literature on sasanquas during the past five years indicates that many others felt as I did. The following account of their introduction, culture, and use is intended to encourage gardeners to plant them in areas where they will grow.

THE INTRODUCTION OF SASANQUAS

Although it is said that *Camellia sasanqua* is found in the wild state on the mainland of China, on the Islands of Formosa and Hainan, and in the foothills of the Himalayas in Indo-China, there is some doubt as to whether the species is indigenous to those areas. It is known that many plants native to Japan, including some azaleas, had an interim home in China before being introduced into western Europe. Buddhist monks and others traveling between the two countries well could have introduced the sasanqua into China at a very early date. The following note by Sir George Stanton in *An Historical Account of the Embassy to China*, published in 1797,

brings out an association of sasanquas with *C. sinensis* (the commercial source of tea) that could account for the widespread occurrence of this species in the coastal areas of China: "The petals of this plant called by the Chinese Cha-Whaw or Flower of Tea, from their resemblance to each other, and likewise the flowers of the Arabian Jasmine, are sometimes mixed among the teas in order to increase their flavor. The *Camellia sasanqua*, which grows upon the tops and sides of mountains, is assiduously cultivated. It bears a nut from which is expressed an edible oil equal to the best imported from Florence."

It is not altogether clear when the first sasanqua reached the Western World. In the early 1600's the Dutch East India Company had an outpost in Nagasaki on the Island of Kyushu, where *C. sasanqua* is indigenous, but there is no record that it attempted to establish this species in western Europe at this date. It is strange, also, that Phillip Franz von Siebold, who was intensely interested in plants and who served in Japan from 1823 to 1829, with the Dutch East India Company, did not introduce this species. Although he later established a nursery in Leyden, Holland, which contained many Chinese and Japanese plants, including the still popular Tricolor and Donckelari varieties of *Camellia japonica*, there is no record of his having introduced any sasanquas.

The most widely cited account of the introduction of sasanquas appears in a paper by William Beattie Booth (see reference at end of this article) in which he said of *C. sasanqua*, "Introduced in 1811 by the Honorable Court of Direc-

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ROBERT L. TAYLOR

Showa-No-Sakae
Camellia sasanqua clones: Velvety
Dainty Bess

tors of the East India Company in the Cuffnells by Captain Wellbank from Japan." Booth apparently took his information from *Hortus Kewensis*.

J. R. Sealy concluded from his studies, however, that the true *C. sasanqua* of Thunberg was not introduced into continental Europe until 1869 and into England until 1879, and that the earlier introductions were of the species *C. maliflora* and *C. oleifera*.

In picking up the sasanqua's trail in the United States, I found the first mention of a sasanqua in the 1822 catalog published by William Prince of the Linnaean Botanic Garden in Flushing, Long Island, New York. He listed a tea-leaved sasanqua called Lady Bank. Another listing appeared in the 1827 catalog of Joshua Pierce, who had a nursery at Linnaean Hill, Rock Creek, near Washington, D. C. If Sealy's conclusions are correct it is more likely that these early "sasanquas" in this country also were *C. maliflora*, which was introduced into England in 1816 and was recorded as flowering under glass in Boston and Philadelphia in 1835. There are no records of sasanquas being imported directly to this country from the Orient before the 1900's.

The sasanquas found in American nurseries and gardens today were largely imported directly from Japan or raised from seed received from Japan by such well-known camellia men and firms as E. A. McIlhenny, Toichi Domoto, Tuskasa Kiyono, and Kosaku Sawada and the Coolidge Rare Plant Gardens. Some of our earlier varieties, such as Rosea, probably came from Europe, and more recently W. E. Wylam of the Huntington Botanical Gardens, San Marino, California, imported a few from Australia.

THE WINTER FLOWERING "SASANQUAS"

It was while visiting the principal camellia nurseries around the cities of Kobe, Osaka, and Kyoto, Japan, in January, 1955, that Eikichi Satomi, Director of the Japanese Camellia Society, first became aware of the winter-flowering "sasanquas." He learned from the local nurserymen that these winter-blooming "sasanquas" were grouped together under the name "Kan-Tsubaki," that only garden varieties were to be found, and

that nobody knew where plants could be found in the wild. He later learned that these camellias belonged to the Chinese species *C. hiemalis* and were imported to Japan about 1925.

The "Kan-Tsubaki" group of camellias has many of the characteristics that one might expect in a hybrid arising from a cross between *Camellia japonica* and *Camellia sasanqua*. Shishi-Gashira, the most widely grown variety, begins blooming in mid-November after most sasanquas have finished flowering. The flowers have the substance and lasting qualities characteristic of *japonica* varieties, and its flower buds can withstand temperatures below eighteen degrees Fahrenheit (the critical temperature for sasanqua flower buds) and still produce good-quality flowers. It is also interesting to note that *Camellia hiemalis* is a tetraploid, which is the chromosome situation that one would expect from a cross between the diploid *C. japonica* and the hexaploid *C. sasanqua*.

Currently, and probably for many years to come, the varieties of *C. hiemalis* will be offered in the trade as varieties of *C. sasanqua*. Of the following varieties listed in *Camellia Nomenclature* published by the Southern California Camellia Society, only two, Shishi-Gashira (syn. Beni-Kan-Tsubaki) and Showa-No-Sakae (syn. Usubeni), are widely available:

- Beni-Suzume (syn. Linnet) — Deep pink shaded white, small, double.
- Bill Wylam—Deep rose, large, semi-double with fluted petals.
- Bonsai Baby—Deep red, small to rose form double.
- Chiri-Tsubaki (syn. Pink Shishi-Gashira), light pink, double.
- Christmas Candles—Bright red, large semi-double.
- Elfin Rose—Rose pink, azalea form, double.
- Gigantea—Red, large, single.
- Jaune (syn. Fortune's Yellow Camellia)—White with large center of yellow petaloids and a few stamens of darker yellow, medium anemone form.
- Kan-Tsubaki—Crimson pink, medium, semi-double.

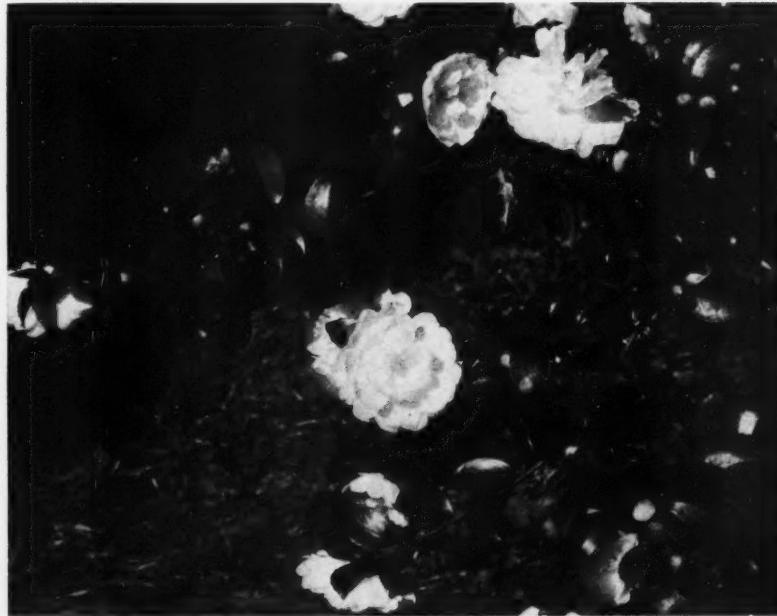


Camellia sasanqua 'Rosy Mist,' large pink, single (above) shrub; (below) close-up view of the flowers





Camellia sasanqua 'Mine-No-Yuki,' large white, peony form flower:
(above) shrub; (below) flowers





Camellia sasanqua 'Jean May,' shell pink, large, double flowers

*Camellia sasanqua 'Choji-Guruma,' anemone form flower,
solferino purple*



Kara-Goromo—Deep pink, very small, semi-double.

Meoto-Zaki—Pink, touched and edged white, medium, semi-double with curled petals, producing two flowers in each bud.

Sandan-Ka—Deep pink, tiered double.

Sandan-Zaki—Rose, medium, semi-double with three flowers sometimes produced from a single bud.

Shishi-Gashira (syn. Beni-Kan-Tsubaki)—Red, medium, semi-double to double.

Showa-No-Sakae (syn. Usubeni)—Soft pink, occasionally marbled white, medium large, semi-double to rose form double.

Showa-Supreme—Soft pink, large peony form.

Winsome—White edged pink, semi-double to anemone form.

OTHER SASANQUA-LIKE CAMELLIAS

In addition to the "Kan-Tsubaki" group there is another group of varieties that are often sold as sasanquas but have in recent years been assigned to a group known as Vernalis.

Dawn, the most widely grown variety in the Vernalis group, was imported from Japan by the Alvin Nursery Company, Alvin, Texas, in 1909, and first distributed by K. Sawada of Overlook Nurseries, Mobile, Alabama. It has been frequently stated that this variety is a hybrid between *C. sasanqua* and *C. japonica*, but this has been disproved by the evidence that Dawn is a diploid and not a tetraploid as would be expected from such a cross.

Although Dawn is often cited as being particularly cold-resistant, it has been disappointing in its performance at the National Arboretum. The flowers begin opening in the Washington, D. C., area during late December and January, when there is virtually no chance of a sufficiently long frost-free period during which their flowers can develop. This is sad indeed, for from Norfolk, Virginia, southward along the east coast, and elsewhere that camellias are grown, this is one of the real gems in camellia collections.

The following varieties are listed in

Camellia Nomenclature as being assignable to the Vernalis group:

Dawn (syns. Gin-Ryu, Gin-Ryo)—White, sometimes suffused pink, semi-double.

Hiryu (syn. Hiryō)—Deep crimson red, rose form, double.

Hiryu-Nishiki (syn. Hiryō-Nishiki)—Crimson splashed white, rose form, double.

Hoshi-Hiryu—Sport of Hiryu, crimson, dotted white.

Kamakura—Shibori—Red, shaded white, small, single.

Kyo-Nishiki—White, striped pink, single.

LANDSCAPE MERITS

Although sasanquas have been in cultivation in this country for over 50 years, it is only in the last ten years that they have emerged from the shadow of their illustrious cousin, *C. japonica*. Some of the reasons for this long period of obscurity are, paradoxically, the same as those for which they are acclaimed today, namely, single flowers, early flowering, and open growth habit.

Double and semi-double camellia flowers have long been favored by the public over single-flowered types. Since most sasanqua blooms are single, they were passed over along with many of the single-flowered japonicas. In recent years, however, gardeners have come to a greater appreciation of the fact that simplicity is an attribute of beauty.

Camellia shows have had much to do with popularizing camellias. Since camellia enthusiasts enjoy participating in these shows, and since sasanquas bloomed too early to be included, they were little planted. Despite this handicap, they have become increasingly popular. No other woody plant grown in temperate regions can match the lateness and showiness of their floral display, which starts in late September and continues until severe frosts cut them down, usually in late November in the Washington, D. C., area.

The loose open growth habit of many sasanqua varieties was long considered one of their main drawbacks as a garden plant. Along with a greater appreciation for single flowers has come an awareness that the long slender branches clothed



Forms of Camellia sasanqua and C. hiemalis foliage

Top: 'Hiodoshi,' variegated;

Bottom, from left: 'Pink Dauphin,' 'Willow Leaf,' 'Shishi-Gashira,' and 'Daydream'

in glossy dark-green foliage add an artistic touch to the garden that cannot be obtained with most *japonica* varieties or with many other plants. There are also compact and low-spreading types among the 200 or more varieties of this versatile species reported to be in the nursery trade. The excellent evergreen foliage of the varieties Willow Leaf and Hugh Evans makes good background for flowering deciduous shrubs. The varieties Cleopatra, Rosea, Narumi-Gata, and Tanya can be made into outstanding hedges. Almost all varieties can be effectively espaliered. There is much variation in the foliage.

HARDINESS AND RANGE OF USEFULNESS

Contrary to popular belief, *C. sasanqua* is no more and perhaps is even less cold-hardy than *C. japonica*. Where limited numbers of varieties of the two species have been grown together in areas that usually experience five degrees above zero and sometimes lower winter temperatures, the *japonicas* have invariably stood up better. Moderate to severe foliage burning in addition to some killing back of late growth was noted in the sasanqua collection at the National Arboretum after a severe cold spell during the winter of 1957-58. During this cold snap, temperatures stayed between four and twelve degrees for two days, and there were almost constant winds of 25 to 40 miles per hour. *Japonica* camellias growing in the same vicinity came through with little or no injury. There is, however, a marked difference in the bud-hardiness of the two species. Observations at the National Arboretum on a number of sasanqua varieties revealed that temperatures below eighteen degrees so severely damaged unopened buds that they failed to open, or if they did open the flowers were of very poor quality. Most *C. japonica* varieties in bud will withstand temperatures of at least ten degrees without serious impairment of flower quality.

The present range of usefulness of sasanquas for their flowering effect extends along the Pacific Coast from Southern California to Washington State, throughout the South, and along the Eastern Seaboard to Washington, D. C. Scattered, small, but successful, plantings outside this range indicate that

sasanquas can be adapted to colder regions if given some protection. The principal barrier to their successful culture from Washington, D. C., northward, in areas where they would be bush-hardy, is the slower rate of bud development. Since high temperatures are necessary for bud development and early flowering, plants in cooler regions would not flower in time to escape freezing temperatures. The flowering time for any particular variety becomes progressively later the farther north it is grown. A case in point concerns the outstanding double white variety Mine-No-Yuki which is highly satisfactory every year from Norfolk, Virginia, southward, but has had only one good year in seven at the National Arboretum.

CULTURE

Sasanquas are easy to grow. Their ease of culture is somewhat reflected in the fact that hundreds of thousands are used each year as grafting understock for *japonica* varieties. The vigorous, compact root systems of sasanquas assure successful transplanting and rapid re-establishment. They are commonly believed to be more tolerant of poor drainage than *japonica* stocks. Although bare-rooted one- and two-year-old plants can be re-established, best results have been obtained with canned or balled stock.

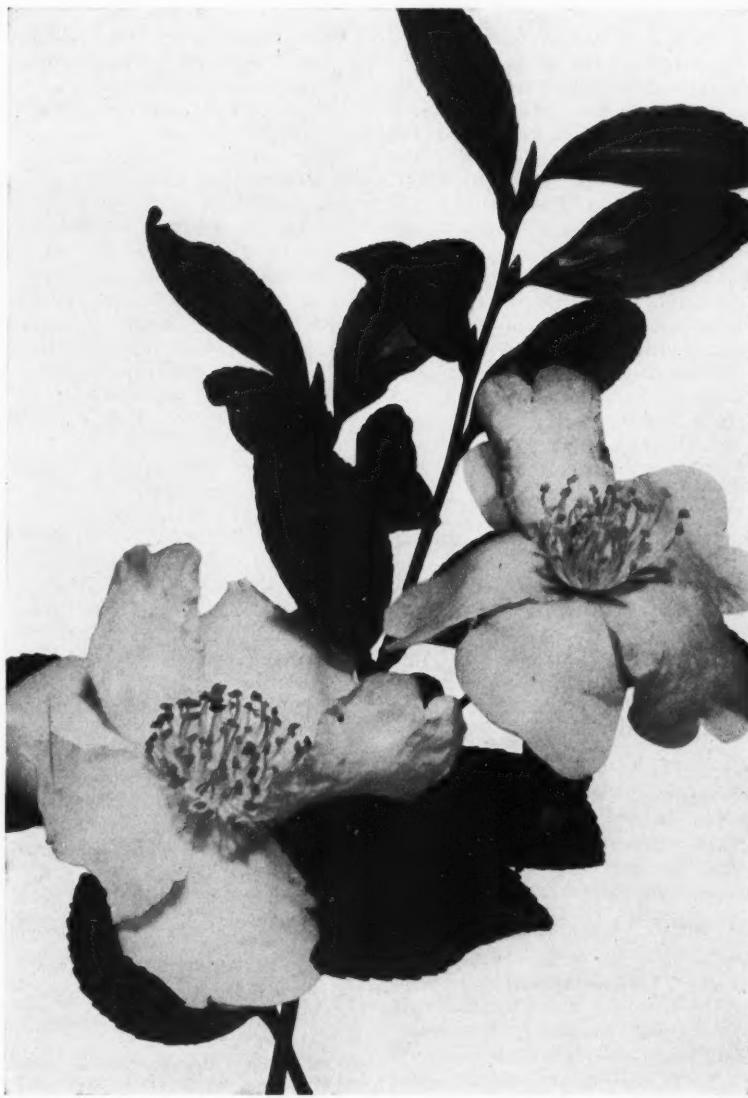
The basic cultural requirements for sasanquas are a well-drained acid soil fairly high in organic matter and a surface mulch of such organic material as pine needles or leaves. The "filtered light" beneath high-trimmed pines seems to be best, in that ample light penetrates through for good flower-bud production while sufficient shade is provided during the winter to prevent leaf burning. The sasanqua can be grown, however, in a variety of light situations from full sun, where it develops its maximum compactness and greatest flower production, to full shade, where it is sparse flowering and usually open in habit.

Camellias are generally planted during late fall and winter in the South. For colder regions spring planting seems to be best as it enables the plant to become well established before cold weather sets in. The most important thing to keep in mind about the actual planting operation is that plants should



ROBERT L. TAYLOR

Camellia sasanqua 'Papaver'



ROBERT L. TAYLOR

Camellia sasanqua 'White Butterfly' and 'Orchid'

not be set any deeper than the level at which they were previously grown. Deep planting is one of the major causes of camellia failures following transplanting.

How much fertilizer to use on camellias depends to a great extent on the level of nutrients in the soil and the physical condition of the natural surrounding soil mass. The well-drained sandy loams at the Norfolk Municipal Gardens in Norfolk, Virginia, although low in nutrients, grow excellent camellias year after year without fertilizing. Since most gardeners do not have such soils, one application of cottonseed meal at the rate of 15 pounds per 1000 square feet (8 to 10 ounces per plant), or a commercial azalea-camellia fertilizer, applied as directed, just prior to new shoot growth in the spring should suffice.

PROPAGATION

Although sasanquas can be propagated from cuttings taken at any time after the new growth has become slightly hardened, best results have been obtained in the Washington, D. C., area with cuttings taken from late July through September. Cuttings treated with root-inducing powders will root within six to eight weeks.

TROUBLES

The sasanqua is virtually a trouble-free shrub. Infestations of scale, mites, and aphids are usually light and can be controlled by spraying with dormant miscible oils and malathion.

RECOMMENDED VARIETIES

Although 200 or more sasanqua, or sasanqua-like, varieties are offered by the nursery trade, only a small number consistently appears on the recommended lists of growers and collectors. The following varieties are among the most popular at present and they are generally available in the trade. The asterisk indicates sufficient trials in Washington, D. C., at the National Arboretum to warrant recommendation for comparable climatic areas.

- *Cleopatra—Rose pink, semi-double, compact upright growth.
- *Crimson Tide—Red, single with ruffled petals.
- Dawn (*C. vernalis* var.)—White, sometimes suffused pink, semi-double.
- *Hiodoshi—Crimson splashed and marbled white, large, single.

- *Jean May—Shell pink, large, double.
- *Ko-Gyoku (syn. Little Gem)—Pink bud opening pinkish white, medium, rose form, double.
- Mine-No-Yuki—White, large peony form.
- *Miss Auburn—Small, single, white center with pink margin.
- *Narumi-Gata (syn. *Oleifera*, but not the species *C. oleifera*)—White shaded pink, large cupped, single.
- *Orchid—Lavender-pink, large, single with cluster of stamens in center.
- *Papaver (syn. *Rosea Papaver*)—Soft pink, large, bell-shaped, single.
- *Pink Snow—Light pink with lavender trace, large, semi-double.
- *Rosea—Deep rose-pink, medium, large single.
- *Rosy Mist (syn. *Rosea Magnifica*)—Pink, large, single.
- Setsugekka—White, large, semi-double.
- *Shishi-Gashira (*C. hiemalis* var.)—Red, medium, semi-double.
- *Showa-No-Sakae (*C. hiemalis* var.) (syn. *Usubenii*)—Soft pink, occasionally marbled white, medium large, semi-double to rose-form double.
- *Splendor (syn. *Rosea Grandiflora*)—Delicate pink with darker pink toward edge, very large, semi-double.
- Tanya—Deep rose-pink, single.
- *White Glory—White, large single with ruffled petals.
- *Willow Leaf—White margined pink, medium, single.
- Yae-Arare—White edged pink, large single.

FURTHER READING

For the reader who desires further information on sasanqua camellias, the following books and articles are recommended.

Booth, William Beattie—"History and Description of the Species of *Camellia* and *Thea*," and "The Varieties of *Camellia japonica* That Have Been Imported from China," *Trans. Hort. Soc. of London*, Vol. VII, pp. 519-562, Pl. 14, 1830.

Camellia Nomenclature—Sixth Revised Edition, The Southern California Camellia Society, 1958.

de Vos, Francis—"Sasanqua Camellias, Autumn Treasures," *Plants & Gardens*, New Series, Vol. 12, No. 3, 1956.

Hume, H. H.—*Camellias in America*, Revised edition, J. Horace McFarland Company, 1955.

Sealy, J. R.—"Species of *Camellia* in Cultivation," *Jour. Royal Hort. Soc.*, Vol. 62, No. 8, pp. 347-369, August 1937.

The Camellia Review—"Sasanqua Issue," Vol. 16, No. 8, July, 1955.

Rare Conifers of Mexico

Eric Walther*

Another flying trip was recently undertaken by the writer to Old Mexico, mainly in search of further knowledge of *Echeveria*, a genus of about 150 species of succulents, natives of Mexico and our Southwest, whose rosettes of leaves are usually beautifully colored and velvety. Numerous other plants seen by me made more or less lasting impressions. Unquestionably the various conifers were notable. In Mexico City itself Chapultepec Park was revisited, and its extensive plantations of the Montezuma Cypress (*Taxodium mucronatum*) admired. Some of these trees were planted before the Spanish Conquest. On a previous visit to Oaxaca we had stopped at Santa Maria del Tule, where grows the largest tree of this species. We had, however, to discount severely the stories of its great age, as well as the reputed visit to it by Alexander von Humboldt, who never got as far as Oaxaca. This old tree is now receiving some care and should survive for a long time to come.

In the lower hills surrounding the Valley of Mexico is the native home of the Mexican Cypress (*Cupressus lusitanica*) nowadays planted widely both here and elsewhere throughout the World. The specific name appears rather misleading, for this is not native to the Iberian Peninsula, nor is it from India, as its other common name, "Cedar of Goa," might imply. *C. lusitanica* has an extensive range in Mexico. It varies in form rather widely which accounts for the numerous synonyms, as *C. lindleyi*, *C. benthami*, and others. The largest specimen seen grew at Villa Obregon. Here in California this cypress is grown to some extent, but does not appear to be resistant to the serious fungus disease, *Coryneum cardinale*.

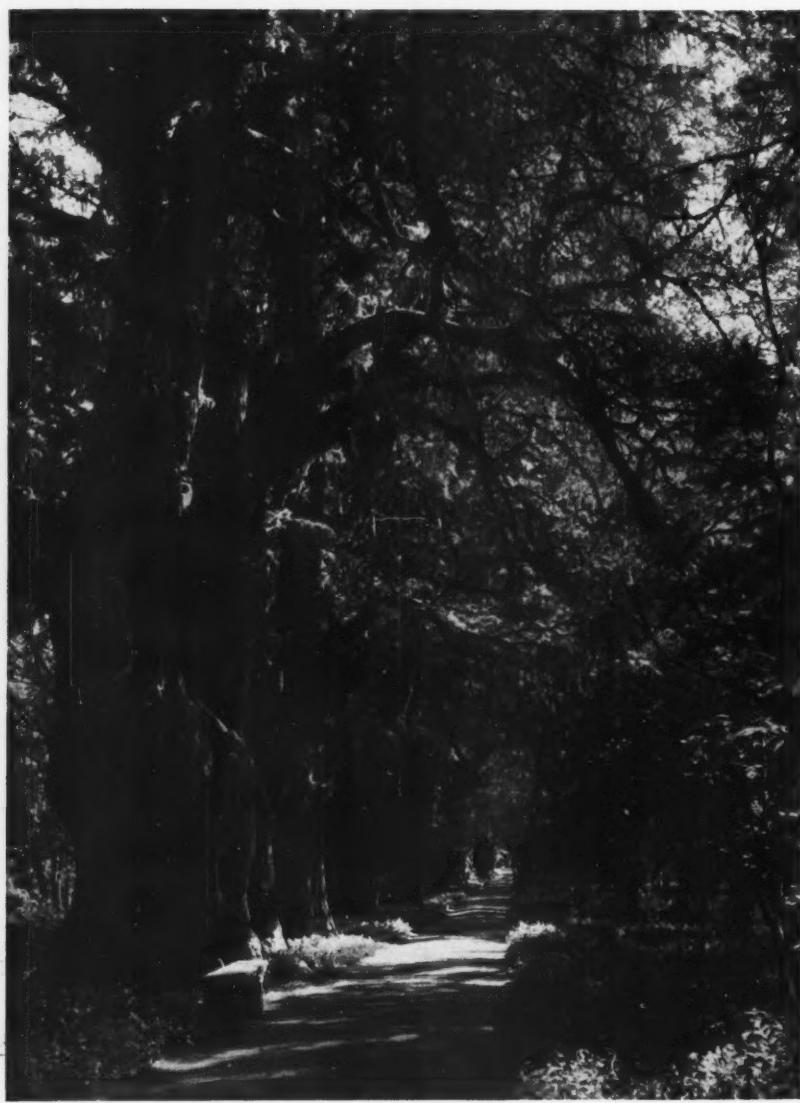
More success seems to attend the cultivation of the various Mexican Pines, not only in California, but in Europe as well. Most striking of these is the Jelecote or Spreading-leaved Pine (*Pinus patula*). The tree seen grew on the Seranía de Ajusco, near Eslava, at about

8,000 feet elevation. Maximum height usually does not exceed 40 feet or so. In England this species is hardy only in the milder counties. In California, while hardy, it should not be exposed to such cutting winds as are often found along the seacoast in summer. The gracefully drooping needles are borne in clusters of three, four, or five, and are striking for they may become as much as one foot long or more. The Montezuma or Rough-barked Mexican Pine (*Pinus montezumae*) is found at somewhat higher levels than *P. patula*. It differs in its darker green foliage which is somewhat less drooping than that of *P. patula*, and usually rather shorter. Its needles number three to eight, mostly five, in each cluster. This species is somewhat hardier than *P. patula*, both in California and in Europe, and less susceptible to wind-burn.

At still higher elevations is found the Aztec or Twisted-leaved Pine (*Pinus teocote*) growing in the mountains near the Zempoala Lakes, where we went to re-collect *Echeveria crassicaulis*, and also found *Gentiana spathacea* both in flower and seed. Our companion on this trip was Sr. E. Matuda, to whom we are indebted for accurate determinations of the pine species involved. Just below this pine-belt we saw some specimens of one Mexican species of *Clethra*, presumably *C. mexicana*, which should be tried in California, at least because of its highly ornamental foliage. The leaves may reach a length of ten inches and are finely velvety and undulate-margined. They would make this an attractive ornamental even if its flowers were not so highly fragrant. Seeds should prove practicable to obtain. A new toll-road, built recently, makes access easy.

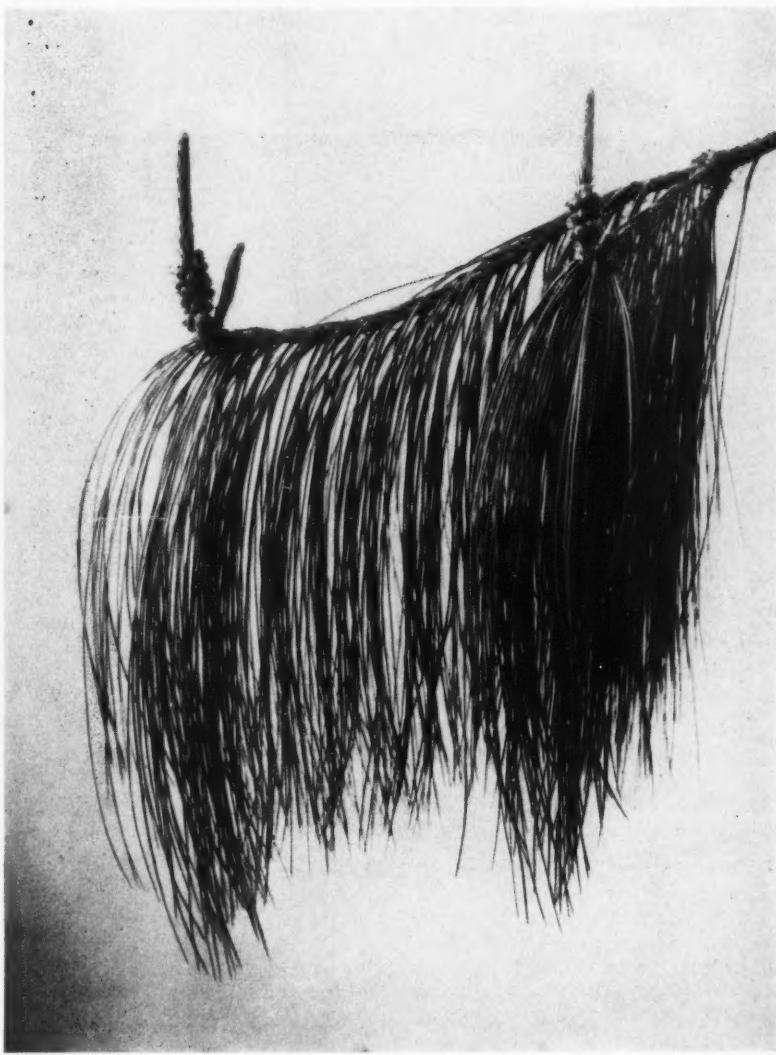
On another excursion to rather high elevations on Popocatepetl and Ixtaccihuatl, the two dormant volcanoes that dominate the skyline southeast of Mexico City, we met with the Timberline Montezuma Pine (*Pinus hartwegii*) sometimes regarded as a variety of *Pinus montezumae*. It forms the tree-line at

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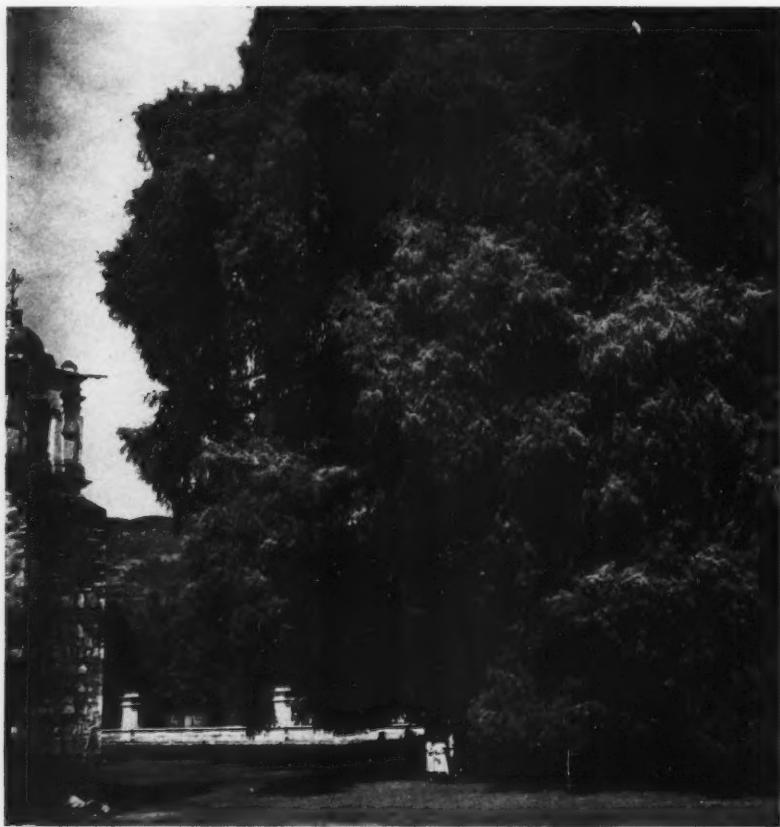
ERIC WALTHER

Taxodium mucronatum in Chapultepec Park, Mexico City



ERIC WALTHER

Pinus patula



W. H. HODGE

El Tule, a magnificent Montezuma Bald Cypress tree located at Santa María del Tule, near Oaxaca, in southern Mexico within a churchyard where it has escaped the effects of vandalism that mar so many of the unprotected and defenseless of our natural wonders. An ever increasing number of tourists from the United States and from foreign lands visit this tree, one of Nature's marvels and a most interesting specimen of tree growth that has endured through the centuries. See page 246 for exposed trunk section.

about 13,000 feet. It occurs on rock-outcrops in an extensive grassland composed of tall tussock-grasses which are one of the few things that can live on the volcanic ash that covers the upper levels. *Lupinus elegans*, *Penstemon campanulatus*, and *Senecio calcarius* are a few of the plants that share this extraordinary habitat. On the rocks outcropping from these ash-slopes we also found *Echeveria pumila* to be native. We thereby established it at a definite Mexican locality

for the first time in our travels.

On a previous visit to this part of Mexico we were struck with the beauty of an evergreen shrub or small tree first seen in flower only, near Encarnación in Hidalgo. There was no seed, but at least we recognized it as a species of the family *Theaceae*. It turned out to be the little-known *Ternstroemia sylvatica* of a genus otherwise known in cultivation only on the basis of the Japanese *Ternstroemia* (*T. japonica*). In the latter the



Cupressus lusitanica, the Mexican cypress, in the lower hills
surrounding the Valley of Mexico



ERIC WALTHER

Taxodium mucronatum. A close-up view of the exposed trunk of El Tule. See Page 244.

flowers are too small to be ornamental and the value of the plant resides in the foliage, often strikingly green turning red. In the Mexican species the flowers may be as much as one inch in diameter, with pure white petals and a tuft of golden stamens in the center. The flowers are deliciously fragrant, scenting the air for a long distance. At a later date we found this in fruit near Tenancingo, and the resultant plants have now been grown in local gardens in California for some years. Here the flowers do not seem to expand as they do in Mexico, but still are just as fragrant. Seed has been borne locally, and cuttings can be rooted, so that wider trials of *T. sylvatica* are practicable. We know of fine specimens in Southern California that

demonstrate the suitability of this species for at least California gardens.

Another field trip, arranged by members of the newly organized Mexican Cactus & Succulent Society, took us to the Sierra de Pachuca. Here at Omitlan, the Mexican White Pine (*Pinus ayacahuite*) was seen. It has the typical five needles and a deciduous sheath. This species has done well in cultivation, not only in California but also in England where in the Wisley Gardens of the Royal Horticultural Society we recently saw a fine young specimen bearing an abundance of cones. Near Omitlan, at Hda. del Carmen, a definite native locale was finally established for the commonly cultivated *Echeveria elegans*, previously known only from cultivation.

A Book or Two

Maples Cultivated in the United States and Canada.

Brian O. Mulligan. American Association of Botanical Gardens and Arborets. (Available from Secretary C. W. Fenninger, Box 216, Lima, Pennsylvania.) 1958. 56 pages. Illustrated. \$2.00. (Library).

The American Association of Botanical Gardens & Arborets has been responsible for two previous publications on cultivated plants of a single genus: *Lilacs for America* (April 1942; rev. Oct. 1953), and *Crab Apples for America* (July 1943; rev. Sept. 1955), although the former was published by the Arthur Hoy Scott Horticultural Foundation of Swarthmore, Pennsylvania, and not by the Association.

The latest addition to this series is *Maples Cultivated in the United States and Canada*. Based on information collected from twenty-four of the major botanical gardens and arborets in the U. S. A. and Canada, its prime purpose is to show what species, varieties and other subdivisions of maples, in the genus *Acer*, as well as hybrids, are now being grown there, and just where each can be seen. Since maples have not yet, like the lilacs, crab apples, and some other well-known groups of garden plants, produced a vast number of cultivars, there has been no necessity to grade these for quality, as was done in the earlier examples.

The twenty-four institutions represented include, in Canada, those at Montreal; Hamilton, Ontario; Ottawa, and Vancouver, British Columbia; in the United States, the Arnold Arboretum; Cornell; Brooklyn and New York; the Morris Arboretum, Philadelphia, the U. S. National Arboretum; the Morton Arboretum, Lisle, Illinois; the Missouri Botanical Garden; the Los Angeles State and County Arboretum at Arcadia; the Strybing Arboretum in Golden Gate Park, San Francisco, and three others also in California; the Finch Arboretum at Spokane, Washington, and that of the University of Washington at Seattle.

Among the contents of the new work are sections on:

1. Geographical Distribution

This shows that maples are found throughout almost the whole of the northern hemisphere, except in desert regions, as far north as southern Canada, southern Scandinavia, Siberia and Manchuria; southwards they extend as far as Mexico and Guatemala in North America; in North Africa from Morocco to Tunis; and in Asia, by far the richest continent in maples, through Siam and Indo-China to the Philippine Islands, Java, Sumatra and Celebes. Species from the Himalayan foothills and south-west China can be grown outdoors in San Francisco as well as in the Los Angeles area, but are not or scarcely hardy in Seattle or around Washington, D. C.

2. Botanical Classification and Cultivars

Alfred Rehder's arrangement in his *Bibliography of Cultivated Trees and Shrubs* (Arnold Arboretum, Mass., 1949) has been taken as the most modern on the genus. In it, *Acer* is divided into two Sections, *Acer* and *Negundo*, the latter containing only *A. negundo*, the Box Elder, and *A. cissifolium* from Japan. Section *Acer* is subdivided into thirteen Series, of which the largest (in cultivation) are *Spicata* (13 species), containing the large-leaved Oregon maple, the sycamore maple, *A. ginnala*, *A. spicatum* and others, and *Macrantha*, whose thirteen representatives are all Asiatic in origin and comprise some of the most elegant and charming small trees for our gardens; amongst them are *A. davidii*, *A. pensylvanicum*, *A. rufinerve* and *A. tegmentosum*; three of these four grow successfully at the Arnold Arboretum, near Boston.

Of the other eleven Series, *Platanoidea*, named for and including the well-known Norway maple, is next in number of species, having eight in cultivation; then follows *Palmata*, with six, all from eastern Asia, excepting the Vine maple from western north America; *Campestraria*, *Saccharina* and *Trifoliata* have five each. Three Series, *Glabra* (*A. glabrum*), *Integrifolia* (*A. oblongum*), and *Indivisa* (*A. carpinifolium*) each show only one species.

Characters are provided by which these various Series may be distinguished.

The numbers cultivated are:

Species	68
Sub-species or varieties	37
Forms or cultivars	160
Hybrids	7
Total	272

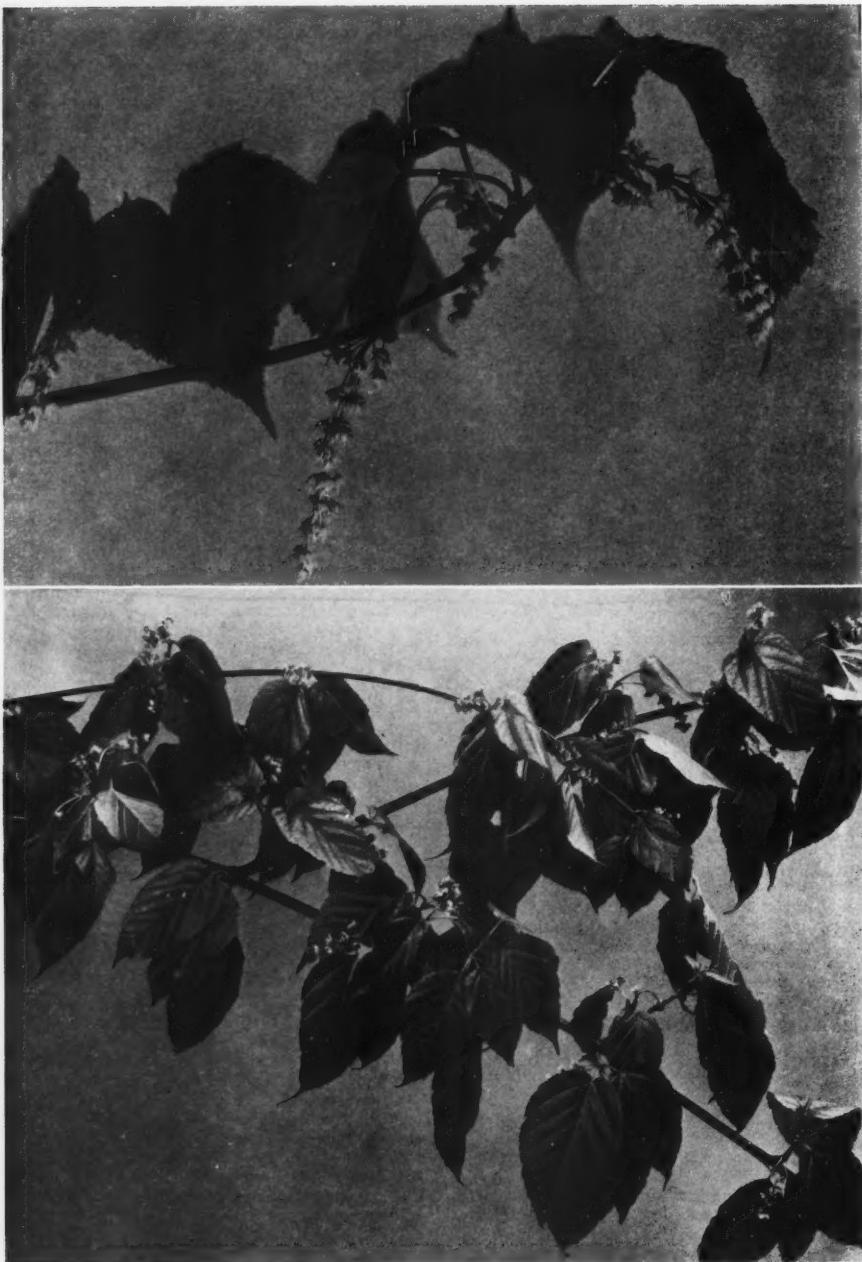
In forms and cultivars *A. palmatum* is, of course, preeminent, with no less than 65; the University of Washington Arboretum has a collection of 50, imported from Japan, 1940-41. The only other species with any large number are the Norway maple, having twenty-four recorded, the silver maple (*A. saccharinum*) with thirteen, and the sycamore maple (*A. pseudoplatanus*) with twelve.

A separate alphabetical list of thirty cultivars indicates the species to which each is related.

Of the 105 species, sub-species or varieties, twenty-nine, or nearly 28 per cent, are only to be found at one institution. In addition, a number of cultivars, especially of *A. palmatum*, are in the same category, so that there is need for much propagation and distribution in the future.

3. Hybrid Maples

Of the seven found in cultivation, four are of nursery or garden origin in Europe (*A. dieckii*, *A. durettii*, *A. zoeschense*, and a nameless hybrid between the Japanese *A. miyabei* and European Hedge maple, *A. campestre*). Another is



Maples illustrated for this review are in the collection at the University of Washington Arboretum, Seattle. (Campus Studios)

Flowering branch, female tree, Acer capillipes (top); flowering branch, functionally female only, flowers green, Acer davidi (bottom). Next page: Male flowering branch, Acer tegmentosum (top); fruiting branch, Acer sieboldianum (bottom). Leaf variations in the forms of Acer palmatum, the Japanese maple, are shown on the front cover, and the frontispiece is Acer cissifolium, male tree, flowers green, in strict pendent raceme, about 4 inches long.

A. senecaensis, a natural hybrid from Rochester, New York, (*A. leucoderme* × *A. saccharum*); the other two are man-made, *A. rubrum* × *A. saccharinum*, at the National Arboretum, Washington, D. C., and *A. davidii* × *A. rufinerve*, at the University of Washington Arboretum, Seattle.

In addition, a hybrid has been produced at the Department of Botany, University of Vermont, using pollen of *A. macrophyllum* on the sugar maple, *A. saccharum*.

A note on recorded chromosome counts amongst maples is added here. Of a total of twenty-eight species on which work has been done most are diploids, but three are triploid (*A. carpinifolium*, *A. pseudo-platanus*, and *A. saccharinum* (all of different Series), while one is octoploid (*A. rubrum*).

4. Maples for various Purposes

- (a) Large shade trees—50 feet or more.

Nine species are suggested, including the Oregon, Norway, sugar and red maples. A warning is given against planting unless ample space is available.

- (b) Smaller Ornamental Maples—20 to 35 feet.

Twenty-one species are named, amongst them the trident maple from Japan (*A. buergerianum*), David's maple, the Paperbark maple (*A. griseum*), Montpellier maple (*A. monspessulanum*), Japanese maple (*A. palmatum*), and *A. rufinerve* from the same country.

- (c) Maples for Fall Color

This list is subdivided by leaf color into five sections—red, red and yellow, orange, yellow, and orange-brown, and includes twenty-six species, well indicating the great value of many maples for this conspicuous feature.

5. Propagation of Maples

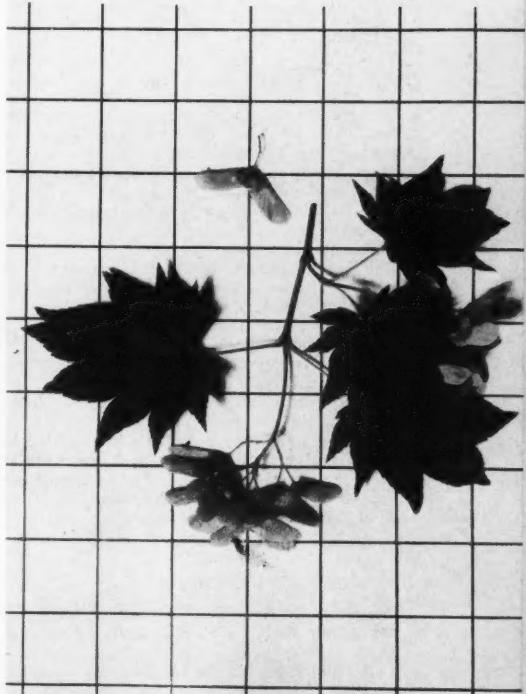
A comprehensive and detailed account follows on this essential part of maple cultivation, written by the former propagator at Arnold Arboretum, Roger Coggeshall.

Increase by seeds is first covered, both under glass or outdoors; then by softwood cuttings under mist and under plastic; both these latter methods are now being used more extensively in commercial practice. The older nursery methods, by grafting and budding, are also fully described and their advantages or disadvantages mentioned. A bibliography of twelve recent items on the subject concludes this very practical article.

6. List of Cultivated Maples

This occupies about two-fifths of the whole publication, commencing with *A. acuminatum* Wall. ex D. Don, and ending with the hybrid *A. zoeschense* Pax.

To those familiar with *Crab Apples of America* it will offer no difficulties in interpretation, and in some respects is simpler, lacking any letters or figures to indicate size or color of flowers or fruits. Included, however, are the names of the botanists responsible for describing each species or lesser category, with the date of publication, the country or region of origin, the common name, if any, and in as many instances as possible data on introduction to cultivation.



Following these details are pairs of capital letters indicating at which institutions each plant is growing.

Bold face type is used for valid botanical names in all categories, italics for synonyms, small capitals for cultivars. The last differs slightly from both the Crab Apple and Lilac lists, where large capitals indicated accepted names of standard horticultural varieties, but yet makes cultivars quite distinct from botanical species and varieties.

The following example will serve: (*Acer cappadocicum* Gleditsch (1785) (*A. laetum* C. A. Mey. (1831))

S. Russia to Himalaya. AA, ML, MS, MT, RO, US.

Plants obtained from A. Lavallee, Segrez, France, by AA in 1878.

f. rubrum (Kirchn.) Rehd. (1922) BC, ML, RO, UW

Intro, to England, 1846.

The Japanese maple, *Acer palmatum*, has required special treatment because of its unique and remarkable variation, especially in foliage characters, and consequent problems in identification. Subdivision into three sections has been made:

(a) Botanical varieties and forms.

This is based on the arrangement in Rehder's *Bibliography of Cultivated Trees and Shrubs* (1949), with the addition of related cultivars under each variety, of which there are four; for examples, under var. *dissectum* we find eight, under var. *linearilobum* only one.

(b) Lesser taxa, to include names of Latin form, such as 'Aureo-variegatum,' 'Filicifolium,' and 'Involutum.' Here we have eight such names, with five synonyms referable to different varieties.

(c) Japanese cultivars

An alphabetical list of forty cultivars bearing names of Japanese origin, such as 'Aoyagi,' 'Harusame,' 'Murakomo,' and 'Sangokaku,' the coral bark maple. One exception in nomenclature is 'Butterfly,' but the plant concerned was imported from Japan. Nine of the forty can be referred to various varieties of the species; two of them probably belong to other species; 'Ayagasa' to *A. sieboldianum* and 'Murasame' to *A. shirasawanum*.

7. Bibliography

The book concludes with a bibliography of twenty-one items, arranged chronologically, beginning with Dr. E. V. Bretschneider's *History of European Botanical Discoveries in China* (1898), invaluable for date on introduction of maple species to Europe, and ending with "New Chromosome Counts in Acer and Fraxinus," by J. W. Wright, published in the *Morris Arboretum Bulletin* (May 1957).

A number of photographs have been added to this publication in order to make it more useful as well as attractive. They include illustrations of maple trees, of flowering branches, of leaves and of fruits of various types.

B. O. MULLIGAN

The Amaryllis Manual.

Hamilton P. Traub. The Macmillan Company, New York, 1958. 338 pages. Illustrated. \$7.50. (Library).

This volume presents what amounts to a life work from the author, who has approached his

subject not only as a botanist, horticulturist, historian, gardener, hybridizer, and so on, but has lived with it and for it all the time, no matter how the battle raged (for it has raged on occasion) or whom the adversary, known or suspected, might be! We can only say, in the phrase that is so often used by English reviewers in the Literary Supplement of the *London Times*, "this work will have to be taken into account by any one who touches this field."

With the most painstaking care, Dr. Traub has examined all the botanical material in the taxonomic field and as a result has taken the old family groups apart and put them together again on the basis of his findings. He has assembled an herbarium on which to sustain his points of view, has grown the materials in his own garden, and lived with the matter. One could hardly ask for more.

This reviewer is not competent to pass any opinion on the wisdom of the results, their accuracy, and so on, and has no wish so to do. There can be only admiration for the devotion and tireless work that has gone into the whole project.

The parts of the book that come closest to the interests of the amateur gardener and garden club member are as carefully done, and as complete. Whether or not one will agree with or even enjoy some of the inclusions, as for example the suggestions quoted from actual use, of schedules for shows, may or may not please any one beside the originators of the same. Certainly the topics offered as titles for "artistic arrangements" on page 207 could bring a chuckle or two from any one in their senses! But doubtless there are those who have to have such crutches.

Don't overlook Appendix B. That is the best part of Dr. Traub's work.

B. Y. M.

Hawaiian Flowers & Flowering Trees.

Lorraine E. Kuck & Richard C. Tongg. Charles E. Tuttle Company, Rutland, Vermont and Tokyo, Japan, 1958. 158 pages. 140 color illustrations. \$7.50.

The two authors, whose *Modern Tropical Garden* has been invaluable to warm-country landscape designers, have now produced a pretty little handbook with color paintings reproduced (by six-color offset lithography) on nearly every page to serve as an identification guide to the ordinary plants in most tropical regions. Most of the subjects are commonly cultivated in Florida and southern California as well as in Honolulu. As the authors point out "The purpose of this book is to answer the eternal question of visitors to the tropics: 'What flower is that?'" The book well serves this purpose.

"Most everyone knows that every flower and plant we see in Hawaii is a traveler or the descendant of a traveler. Each kind must have crossed at least two thousand miles of salt water to get to the islands. For the Hawaiian chain has always been an island group, since it was formed. No land bridges ever existed to the continents along which plants and animals could make their way."

The brief descriptive texts are uniformly good, although it is unfortunate that careless editing has left some glaring mistakes. (Printed in Japan).

EDWIN A. MENNINGER

Exotica. Pictorial Encyclopedia of Indoor Plants.

Alfred Byrd Graf. Roehrs Company Book Department, Rutherford, New Jersey. 1957. 643 pages. 4,000 illustrations. \$17.50.

This is basically, of course, an illustrated book of foliage and flowering plants grown in greenhouses and in the homes as decorative material. The illustrations, for the most part, show the plants as a close up of the leaf or flower; in some cases, the entire plant, or a sufficient amount to make it possible to identify. The engravings are arranged alphabetically according to the plant family names and alphabetically within the families according to the generic names.

This illustrated portion is followed by a large section having a brief description of each plant and a code as to the culture and care. There is a general culture section dealing with the culture of such plants as would be necessary in the home or in a place where they are used for decorations. The author has included many pictures to show actual use of such plants in the home and as decoration in public and business buildings. An interesting section illustrates and describes the propagation of these plants. The list of common and scientific names is a useful part of the book. The final section is entitled "Plant Geography" and discusses the distribution of plants in the world with special mention of those families and genera found in the tropical areas.

The front end-paper is a C.S. Hammond & Company multi-colored map of the world with special reference to the tropic belt, an area 3,200 miles wide, with the countries and islands which, together with the subtropics, extending on either side another 450 miles (to 30° latitude) are the native habitats of most of the exotic plants used for indoor decoration. The third inside cover explains certain cultural data (in four languages) used in the text, while the last section of the rear end-paper gives a good illustrated description of botanical terms.

Exotica is a "must" book for the person interested in decorative plants and their culture. Garden Club and horticultural societies will find it an excellent addition as a book reference. Some illustrations may not be sufficient to identify a plant but in general the book will help to identify most kinds. It is well indexed. Albert Graf has done an excellent job in assembling this information on those plants that are becoming of greater horticultural interest.

C. B. L.

Flowering Stones and Mid-Day Flowers

G. Schwantes. Translated by Vera Higgins. Ernest Benn, Limited, London, England. (John de Graff, Inc., New York, New York.) 1957. 420 pages. Illustrated. \$25.00. (Library).

The mid-day flowers or Mesembryanthemaceae have always been a fascinating and baffling group of succulents. Until 1921 when N. E. Brown of Kew first undertook to break up the

genus, all of its varied forms of growth and blossoms were lumped under the one generic name of *Mesembryanthemum*. It seemed obvious that some division of this genus must occur, but until careful study of living material could be made it was well-nigh impossible to be sure of dried specimens that bore no resemblance to the plump and water-filled living plants. Obviously, the best authorities for this work were collectors of these plants in their native Africa or persons having access to large private or public collections. Dr. Schwantes, of the University of Kiel, falls in this latter class as his collection forms a major portion of these plants at the Kiel Botanical Garden.

The key to the classification of these pleomorphic plants seems to lie in the amazingly specialized seed capsules which in most cases have the ability to open only when ripe and after exposure to free moisture. Neither flower color, nor plant form, is of value in classification. Plants raised from a single seed capsule may vary greatly in form and flower color, while very similar appearing plants may have entirely different fruit structures, thus placing them in different genera. In cultivation away from their native habitat, particularly in reduced light, the appearance of the plant may become entirely different, thus adding confusion. The dividing line between different species is sometimes extremely difficult to find due to marked similarity in forms which constitute a continuous population varying imperceptibly from one extreme to another with the "species" at either extreme. *Ophthalmyophyllum* (eye leaf) is a good case in point where no satisfactory method of determining species has been found. Dr. Schwantes suggests, and probably correctly, that this genus, as well as some others, probably represent "populations" which are in process of forming new species. He comments on the problem of species also in reference to *Lithops* (pp. 196-97). Certainly the Mesembryanthemaceae is a family likely to cause great confusion in a strict rule-of-the-book taxonomist.

Little known genera of Mesembryanthemaceae have varied peculiar shapes and almost as varied properties. A good example is the ice plant (*Mesembryanthemum crystallinum*), whose stems and leaves sparkle with clear, water-filled blisters. *Scleletium tortuosum* contains a narcotic alkaloid, *Carpobrotus edulis* is an edible species, while *Khadia* has species whose roots are used by the natives in preparing a drink. Several genera contain species that have extremely high salt concentration in the sap. *Hydrodea sarcocalyantha* is a prime example, living as it does where waves from the Atlantic wash over its trailing stems.

The forms of the plants are almost unlimited. In addition to the ice plant already mentioned there is *Psammophora* whose sticky leaves collect sand and dust until they resemble the surrounding surface. Many species in several genera mimic the surrounding rocks in shape, size and color, making it difficult to see them when not in bloom. The flowers are often brilliant to the point of gaudiness. *Lampranthus conspicuus* has almost fluorescent fuchsia flowers which reflect light to an extent that they color the surrounding rocks.

The above is only a little of the material covered in Dr. Schwantes' book. There are interesting notes and accounts of collecting expedi-

tions in southern Africa which help to round out the picture of this varied desert region and its plants. Excellent photographs of numerous species are found throughout the book and eight color plates in addition show plants of particular interest.

To the amateur who has become particularly interested in growing the very dwarf, compact members of the family, Dr. Schwantes' treatment of Lithops and Conophytums will be of considerable interest and help in growing the more difficult species.

Vera Higgins must be thanked for the excellent job she has done in translating this book from German. Her own great knowledge of succulents has been of immeasurable help in this work. My one regret was that no bibliography was presented. A few references are found throughout the text but it would be difficult to find them again after reading through the book. A minor annoyance, but one that is common where illustrations are referred to in the text, is the lack of a cross reference to let the reader know where the text can be found for a particular figure.

Certainly for the ardent lover of succulents this will be a fascinating book to read and refer to often, if only in the hope of obtaining some of the unbelievable plants described. The book is well printed and well illustrated, which makes the high price understandable.

F. W. COE

Flower Chronicles.

Buckner Hollingsworth. Rutgers University Press, New Brunswick, New Jersey, 1958. 302 pages. Illustrated. \$5.00.

The author has shown keen interest, understanding, and research in the recorded histories of plants as they relate to the history of mankind, during the past several years. She has had published many articles of her findings, experience, and speculations. Five of her "plant histories" have appeared in this Magazine: "Nasturtiums," (Oct. 1952); "Iris," (April 1953); "Peony," (April 1954); "Lily," (April 1955); and the "Saffron Crocus," which appeared in the last issue. "Prehistoric Flowers," appeared in the September 1952 issue of the Massachusetts Horticultural Society's *Horticulture*; "Peony, the Food of Kings," in the March 1954 issue of *The Bulletin of the Garden Club of America*; and an article on the Lily in the July 1953 issue of *The Home Garden Magazine* (Now incorporated with *Flower Grower*).

The present book brings together these titles and adds histories on the Rose, Tulip, Daisy, Poppy, Cornflower, Primrose, Dahlia, Marigold, Pinks and Carnations, and Narcissus. Another article on books and flowers give the overall sources and records the thrill of discovery.

The last section of the Chronicle contains a fat bibliography of almost 200 works in the fields of cookbooks, stillroom books, herbals and books about herbals, pharmacy, medicine, archaeology, antiquity, heraldry, plant hunters, and the like, which Mrs. Hollingsworth combed for her stories—all of which she tells in an exciting, invigorating, and factual manner, and a style of storytelling all her own.

The Species Problem.

Edited by Ernst Mayr. The American Association for Advancement of Science, Washington, D. C., 1957. 395 pages. \$8.75.

Most gardeners will be little concerned with what criteria taxonomic botanists should use in delimiting a plant species and determining what individuals of a plant population fall within or without a particular species. The book is a symposium on this problem presented at the 1955 meeting of the American Association for Advancement of Science. There are articles by eight distinguished botanists, zoologists, paleontologists, and physiologists, covering the species problem with regard to both plants and animals.

In general the discussion revolves around two competing species concepts, the morphological concept, i.e., degree of difference based on form or anatomy, and the biological concept, i.e., reproductive isolation of one group of plants from another and inability to hybridize. The biological concept, of course, cannot be applied to plants that reproduce only or largely asexually.

Some gardeners probably wonder about the wide pattern of variation among plants given the same species name and the occasional inability of some such plants to hybridize despite their being in the same species. Other gardeners may wonder about the minute differences that frequently lead taxonomic botanists to placing in different species plants that have no observable differences of importance to a gardener. Both groups of gardeners will be interested in this book. They will come out with their own views as to whether either the morphological or the biological concept is a panacea in classifying the complex plant communities that arise and disappear over the years as evolution proceeds. They will, however, have some appreciation why absoluteness and finality in defining a species is close to an impossibility in most instances.

The studious gardener who finds this volume to his liking will probably be inspired to move up from the species level to the genus level and read *Plant Genera, Their Nature and Definition*, a symposium conducted at Cornell University and published in 1953 by the Chronica Botanica Company.

FREDERIC P. LEE

Depth and Design in Flower Arrangement.

Emma Hodkinson Cyphers. Hearthside Press, Inc., New York. 1958. 118 pages. Illustrated. \$3.95. (Library).

Emma Hodkinson Cyphers' latest addition to the long list of books she has written on flower arranging is an important addition to this kind of "art."

The present title has many line drawings as well as photographic engravings and will help the student to understand that elusive quality which can make or mar an arrangement. Here is the key to the why and how to achieve sculptural thickness and to emphasize the importance of space. The basis of good design presented in a new and pleasing manner.

F. P.-K.

Modern Japanese Art of Flower Arrangements. VI.

Seika Nishizaka. Hanano-Shiori-Sha, Kobata, Kyoto City, Japan. Distributed by Charles E. Tuttle Company, Rutland, Vermont & Tokyo, Japan. 1956. \$7.50.

Seika Nishizaka does a very beautiful job of explaining the purpose of the *modern* Japanese art of flower arrangements, and we let Miss Michiko Nakata do the translating: "Styles in industrial and fine arts change with the times. This is because they are the creation of the people of those particular periods, and because the current of the times and the ideas of the men who created them are reflected in the product, which, of course, is to be expected."

"It is only 25 years since we first published *Hana*, our monthly magazine devoted to flower arrangements, but during this period there have been considerable changes in floral art. With the purpose of recording the changes in the manner of flower arrangement for posterity and, at the same time, of popularizing Japanese floral art abroad, thereby contributing to the beauty and pleasure in their daily lives, we first published our first volume of *Modern Japanese Art of Floral Arrangement* in 1936. * * * Since then five volumes have already appeared, as much as 70 per cent of these books having been exported. Now, as I send forth this sixth volume, I am at a loss to find fitting words to express my appreciation to the overseas lovers of floral art. * * *

"From the time Japan was defeated in World War II we lost our faith in age-old beliefs, our very foundations of thought were shaken, and the tendency to depend more and more upon the West grew stronger. We went so far as to discard our virtues and become enamored of Western civilization. * * *

"The same has often been repeated in the history of Japanese art and is not a cause for alarm. With the passage of time, I believe, what is good has been absorbed and had a beneficial effect on healthy developments, but the art of floral arrangements is yet in an age of transition and confusion, as it were, undergoing the pangs of birth.

"Two conflicting trends are ever increasing in their wide difference. One clings to the traditional manner, and thinks of flower arrangement as limited strictly to the use of plants. * * * The other, to give full satisfaction to their creative urge, break through traditions and restrictions placed on floral art in making free use of dead trees, stones, iron, glass, plastics and all other possible materials * * *. No one, however, should declare which is right and which is wrong. * * * We must, however, acknowledge the fact that such new creations by progressive persons must have contributed a freshness to the tradition-bound conservatism * * * and proved to be an impetus to growth * * *."

Without a friendly debate for a temporary feeling of what progression or regression may have been reached in the present volume, there are some splendid examples of what must have satisfied the arrangers' "creative urges," and others, which must be examples of splendid creative urges.

The book has eleven pages containing a short history of the movement; 24 painting by Tatsushi Higuchi, nicely reproduced, about ten

by fifteen inches, and each has a covering sheet with the subject painting in black and white and descriptions of the material, container, etc. in English and Japanese.

On Publishing Books

The "book collector" and the curious, are often interested in how certain books come about, the background of the authors, the publishers, the fine art of book making (!), as well as the contents of the books. Many titles have arrived on the market in the past few years having sound texts as well as being works of art, and have had the satisfying Oriental influence of subject matter and manufacture. In the last issue of this Magazine, one such book was reviewed "The Japanese Art of Miniature Trees and Landscapes," and the following behind-the-scene-account of its producer should be of interest.

The swinging sign in front of the tall old red bookshop on South Main Street in Rutland, Vermont, reads: "Charles E. Tuttle Company, Established 1832." Actually the Tuttle Company's predilection for books and publishing goes back much farther—to the famous Elizabethan printer of the 16th century, Richard Totel of London. The important date in the Tuttle saga, however, is 1832, when George Albert Tuttle (1816-1885), a young man of sixteen, started work as a printer in Vermont. Several distinct Tuttle enterprises in Rutland today trace their history back to the time George started printing and selling books under his own imprint a few years later. George Albert Tuttle was the first figure in what proved to be a Vermont dynasty of printers, for his four sons and their sons went into the printing and book-selling business.

George Tuttle's grandson, Charles E. Tuttle (1878-1943), spent five years in a mail order book house in Chicago, developing an interest in old and rare books in the process. Returning to Rutland, he added an antiquarian book department to the numerous activities of the Tuttle Company, which then included everything from printing official state reports to selling wallpaper.

Charles E. Tuttle, Jr., the present proprietor of the firm, has known and handled and sold books from before he can remember. He absorbed book knowledge and book values with his ABC's. Book selling on the road as a youth, and a Groton and Harvard education, increased his competence. Before the war he went into the business as his father's partner.

At the end of the war, the younger Charles E. Tuttle, then a Captain in the Army, found himself with the Civil Information and Education Section of General MacArthur's general headquarters occupying Japan. Tuttle inevitably gravitated to the famous Kanda street of bookshops—and with his specialized knowledge quickly discovered treasure-trove almost beyond imagination: fabulous old volumes long out of print, vast stores of English, American, and European books form the libraries of prewar foreign residents and Japanese collectors. Some were worthless; many were interesting curiosities; others were priceless. It was a "find" such as a book dealer might dream of for a lifetime and never discover, and Tuttle immediately began buying.

Soon he also began selling, first through a concession in the big Takashimaya Department Store, then in the Army PX's, and in his own stores in Kanda and Okinawa.

His early market was almost as fabulous as his first book-finds; Japan in the late forties and early fifties was teeming with eager Americans, military, dependents, and DAC's, thousands of them avid to learn about the strange and fascinating country in which they found themselves. There was a tremendous need for books on Japan, and Tuttle undertook to meet it.

In addition to importing from the United States every available title on Japan, Tuttle began his own publishing program, which has grown to include practically every aspect of Japanese culture—art, language, cookbooks, literature, manners and customs, games and sports, history, guidebooks, etc.

The Tuttle firm now operates under the motto "Books to Span the East and West" and is carrying on a flourishing two-way trade, exporting books on Japan and the Far East to America and importing into Japan, American books and magazines of every possible description.

Flowers Native to the Deep South.

Caroline Dorman. Publishing agent: Claitor's Book Store, 241 North Street, Baton Rouge 2, Louisiana. 1958. 176 pages. Illustrated. In color and black and white. \$7.50.

This very definitely and as the author says, is a book written and planned for the amateur. Its text is a model of lucidity and brevity. The few technical terms are defined simply and many are further clarified by the drawings in the early part of the book.

The selection of plants to be included, after the arbitrary exclusion of woody plants, must have been difficult, but again, most of the plants discussed and shown are species that all would see, if they know how to look. The notes on cultivation are few, and mostly cautionary!

The enormous value of the book lies in the illustrations, whether they are colored or line drawings in familiar black and white. These are splendid, and catch the character of the plant amazingly, even in the portions shown, for it was not possible to draw the entire plant in many cases. The most interesting feature to the reviewer, is that the drawings show no treatment to indicate light or shade, but depend entirely on the perfect drawing, and such contributions that can be made by patterns of venation or color markings, with a skill that has some parallels in Oriental work. Having spent endless hours in making scientific drawings in the field of entomology, the reviewer looks on this work with particular delight.

If one has any regrets, they would be that Miss Dorman could not or did not lend her keen observations to more details of habitat which is briefly even succinctly given, and to some suggestions as to the methods of growing wild things from seed, when seed would be ripe, which plants would be furnished with explosive capsules, and all that kind of thing, which one is positive she knows!

B. Y. M.

An Easy Guide to House Plants.

Arno and Irene Nehrling. Hearthside Press, Inc., New York. 1958. 100 pages. Illustrated. \$2.95. (Library).

This is a handy and small book for the amateur grower of house plants—it will not satisfy the serious collector.

There are chapters on designing planters, using potted plants for terraces, plant requirements, propagation, special purposes for plants, flowering bulbs and growing plants under artificial light—all most attractively illustrated with drawings by Charlotte E. Bowden. There is also one chapter of thirty pages on "A Dictionary of Favorite House Plants" with names of and cultural directions for many of the better known house plants.

GRACE P. WILSON

Complete Guide to Hardy Perennials.

Frances Perry. Charles T. Branford Company, Newton Centre, Massachusetts. 1958. 288 pages. Illustrated. \$5.75. (Library).

The book is illustrated by such well known artists as the Australian flower painter Paul Jones, Pamela Freeman, and Dorothy Fitchew. The book makes a worthy addition to the garden book shelf. Here is a comprehensive listing, arranged under species headings, with height, growth span and time of flowering, and details of cultivation for the plant described together with historical information and the lore with which they are associated.

It may come as a shock to some American gardeners to find many of the subjects listed for border planting are held to be roadside weeds in the United States. But the book was written by an Englishwoman, primarily for the English garden, where goldenrod is often seen gracing the best of the perennial borders.

F. P. -K.

Flowering Plants from Cuban Gardens.

The Garden Section of the Woman's Club of Havana. Criterion Books, New York. 1958. 365 pages. Illustrated. \$6.95. (Library).

Here is an excellent handbook of common tropical trees, shrubs, vines, and other garden subjects, written and illustrated by a group of flower-minded women who live in the tropics and really know their plants. Each subject is illustrated with a line drawing that may be hand colored, and is described in 150 words, first in English, then in Spanish.

These Havana women published the first edition of this work in 1952. It met such a spontaneous demand that it was soon out of print. They realized its shortcomings, and they set out to compile a new edition that met previous objections. They have succeeded handsomely. Some 40 new subjects have been added to make the second edition of this book more complete.

The book is highly recommended to those who like a quick, authoritative guide to common tropical garden plants.

EDWIN A. MENNINGER

Plant Buyer's Guide of Seed and Plant Material in the Trade. Sixth Edition.

Edited by H. Gleason Mattoon, Massachusetts Horticultural Society, Boston, Massachusetts, 1958. 298 pages. \$15.00.

This is an admirable work and one that is really as vital a part of a reference library as a dictionary. One can only offer Mr. Mattoon and his co-workers, a vote of thanks for all the weary hours that must have gone into the compilation of all these data.

The plan of this edition is rather different from that of the last, for responsibility for supplying sources of the horticultural forms of the more important plant groups is now turned over to the officers properly designated in the national organizations for: African Violet, Begonia, Bromeliad, Camellia, Chrysanthemum, Dahlia, Delphinium, Epiphyllum, Fruit, Small Fruit, Fuchsia, Geranium and Pelargonium, Gladiolus, Hemerocallis, Hibiscus, Holly, Iris, Lilac, Lily, Narcissus, Nuts, Orchids, Peony, Phlox, Rhododendron and Azalea, Rose, and Tulip. The officers of these groups will change perhaps annually, so that one may have considerable correspondence before getting the data. In the one experience of this type of inquiry that has fallen to the lot of the reviewer, the society in question did not have real answers and the one suggestion offered proved to be without value. The contention of the society that lists of named varieties or clones would make an unwieldy volume and one that would be out of date annually, is perfectly correct no matter how one may regret the necessity for the change.

One notes with some interest that in the lists of nurseries cited under the several headings noted above, there are nurseries that are not represented by their products in the pages of the book.

There are the usual number of typographical errors, with which the reviewer has a most sympathetic feeling, none noted so far, that could not be solved by using a little imagination. One can only praise the success of the whole undertaking and not cavil at the few things not enjoyed!

B. Y. M.

The Directory of American Horticulture for 1958.

Carol H. Woodward, Editor. The American Horticultural Council, Inc., available from Donald Wyman, Secretary, Arnold Arboretum, Jamaica Plain 30, Massachusetts. 1958. 72 pages. \$1.50, postpaid.

. . . a current address book of 418 national, regional, and state horticultural organizations in the United States, complete with information on the presidents, secretaries, and publications of these organizations, at the time of printing.

The names and addresses of 103 American botanical gardens and arboreta, 61 non-commercial garden centers, 294 universities, colleges, and junior colleges teaching horticulture and related subjects, as well as information on major horticultural periodicals in this country and their editors, are also provided.

Guide List to Plants, Strybing Arboretum, San Francisco.

Eric Walther and Elizabeth McClintock, Strybing Arboretum Society, San Francisco, California. 76 pages. \$1.00.

Anyone who lives within visiting distance of the Strybing Arboretum, or who intends to visit the Arboretum with more than casual interest, will find this small booklet of great value. The Arboretum, which is located inside the boundaries of Golden Gate Park in San Francisco, contains many rare and unusual plants which are made more interesting by the material given in this list. The location of the plant in the Arboretum as well as its place of origin is given. A diagram and map make it quite easy to locate plants and an index of common names is very helpful for those not familiar with the Latin names.

Commercial Flower Forcing. The Fundamentals and Their Practical Application to the Culture of Greenhouse Crops. Sixth Edition.

Alex Laurie, D. C. Kiplinger, and Kennard S. Nelson. McGraw-Hill Book Company, Inc., New York. 1958. 509 pages. Illustrated. \$9.50. (Library).

There have been many changes in the commercial production of florist crops since the fifth edition was published in 1948. The rapid changes in transportation, introduction of more labor saving devices, additional research in plant nutrition and in photoperiodism and temperature have made this sixth edition necessary.

The authors have taken each of the topics discussed and brought them up to date. The rewriting has been more extensive than in previous editions. New topics have been introduced such as plastic covered structures and greenhouse cooling with descriptions of the several systems that are in use. The chapter on the environment has been extended and rewritten to include the latest research as it applies to florists' crops. Certain sections of the book have been reorganized to include new practices and materials as the use of liquid fertilizers, and the new fertilizers and pest control materials.

The discussion for each of the major crops has been made more complete by putting together, not only the general cultural requirements but also propagation, pest control, and marketing. Under chrysanthemums there are included the schedules for out of season growing of this plant. The flowering and foliage plants are covered as well as the bedding plants. The importance of following plants at present is shown by increased space being given to their discussion.

The authors have done an effective job in assembling much information and condensing it into a form that is easily followed and read. Those who have found the past editions of so much value will find this edition of equal or greater use. As a textbook it has one lack: there are no bibliographies included for either the general chapters or those covering the specific crops.

C. B. L.

New Era Modern Guide to House Plants.

Ann Warren. New Era Books, Clinton, Connecticut. 1958. 128 pages. Illustrated. \$79.

This is a small paperback, with excellent material in it. It appears to be addressed chiefly to the urban gardener who will have to depend on commercial sources not only for plants themselves but for soil and everything else that goes with growing house plants. The only necessity that the reviewer did not note is an offer for sale of plant stands, racks, shelves, etc. Everything else is offered on page 128. The only regret, in the reviewer's mind, is the use of the most distressing kinds of fancy pots as illustrated on page 19. They are hideous and they are not easy to use, especially when the time comes for getting the plant out for replacement or repotting.

Nearly everything that is discussed is the kind of plant material that one would buy of a florist. There is also careful note of those plants that usually do not do well in the house, that one may receive as a gift with only the Christmas poinsettia missing.

The text is remarkably good, and well worth reading, even if nothing in the world would induce you to grow a houseplant! The suggestions on troubles and management, though under those terms, are splendid.

The section on African violets seems to have most of the absolutely vital facts, though there is an alarming understatement in regard to the number of named varieties in trade, and no section that really tells of what happens when the owner starts to propagate the things, an overflow of the whole house, even the bathrooms being free . . . but no matter. Read it by all means, and you will find more for your money here than in some more pretentious books!

B. Y. M.

1001 African Violet Questions Answered by Twelve Experts.

Helen Van Pelt Wilson, Editor. D. Van Nostrand Company, Inc., Princeton, New Jersey. 1958. 384 pages. Illustrated. \$4.95. (Library).

The title tells the contents of this book and the African violet enthusiast will read each chapter, the introductions to all of the contributors plus all 1001 questions and answers, agreeing or disagreeing as they read along.

The questions are arranged into logical groups or sections dealing with such topics as culture, soils and fertilizers, propagation, greenhouse growing, showing, shows, and the troubles—their cause and cures. The questions were provided by the contributors plus a number from the African Violet Magazine. Some are so similar as to confuse some readers. And when it comes to the soil in which to grow this plant you can find just about any recipe you want, even the measurements by the coffee can, gallon, quart, cups, tablespoons, by parts and by volume. All this adds up to the fact that African violets are tolerant plants but are easier grown in a soil, loosened with organic matter, a well aerated, well drained soil.

This is a book for the hobbyist, and the beginner will find answers to his questions.

C. B. L.

Be Your Own Nurseryman.

Robert Scharff. M. Barrows & Company, New York. 1957. 223 pages. Line illustrations. \$3.50. (Library).

This is an intriguing book, but one can only wonder what the people who own and operate real commercial nurseries think of it. The title might well have been, "How to Beat the Nursery Prices, and Earn a Little on the Side."

It contains basically, all the fundamental information that will make the home owner who is willing to work, wait, and spend a limited amount of money, a small nurseryman. It offers suggestions as to sale of surplus, but has no reference to actual cost production prices, "since overhead is low," and no reference at all to the inevitable inspections that State authorities require for shipping.

The information is sound. The suggestions pertinent. The area that is served is northern and a few of the comments added for the sake of appearing to cover the whole field, are not too well chosen, as for example "the magnolia, eucalyptus, palm, and pepper trees on the other hand, are best situated in Southern States." Of these, only magnolia and some palms would do for Southern States, the rest better for California and parts of the southwest.

The only serious omission in the opinion of this reviewer is that he did not find it if present, a warning, that if your nursery expands, it will turn into a task master that requires almost 24 hours a day, seven days a week, and all the weather-free time in the year. The only relief will come when it rains, as any nurseryman can tell you! And even then if you have gone in for greenhouses, your time is not your own.

That there are delights in growing small stuff on to maturity, no one can deny or would wish to, but be warned, your time will be no longer your own, the more successful you become.

B. Y. M.

Gardening, Forcing, Conditioning and Drying for Flower Arrangements.

Arno and Irene Nehrling. Hearthside Press, Inc., New York. 1958. 228 pages. Illustrated. \$3.95. (Library).

This book covers a tremendous field—the only book devoted to planting for flower arrangement known to the reviewer—and perhaps could have been better handled in several books, each treating only a small portion of the titled subjects.

The information, insofar as it could possibly have been published in a single book, is practical and there is really a lot of data in the 228 pages. There are 65 photographs and color plates and dozens of line drawings, good, by Charlotte E. Bowden and Charles A. Mahoney.

F. P. -K.

The Gardeners' Pocketbook

How to Handle Various South African Cormous Species in the Deep South

Although the editor has had really excellent results from the corms of various ixias, sparaxis, tritonias, watsonias and other genera of South African origin, the winter of 1957/58 with its continued cold and unusual lows played havoc with them. All tend to make foliage growth in autumn and while they have endured some frosts that burned the tips, and then recovered, they did not survive well the continued cold and the lows of the past season.

Some of the material had come from a member in California, Dr. L. T. Peery of Hayward, who raises them all but perhaps more sparaxis than others and in some strains not generally available in the East. In writing to Dr. Peery of the season's losses, the reply came back which is quoted in part as follows.

"In regard to the South Africans in your part of the country, during an ordinary winter there, as long as the temperature does not go below about 24 degrees, I suspect the best bet would be to grow the smaller corms in containers as I do a good many of them here. I make small flats about 12" x 18" or so, and either four or six inches deep. I use these mainly to grow on small offsets, which here, in most cases, reach flowering size the following spring. These blooming size corms I can give away or use to renew my supplies for permanent planting. When the corms are ripe, I empty them from the containers and store them in tins of some sort for the summer, replanting them in the autumn either out of doors or in the same flats using the same soil in which they had grown the previous year with the addition of some sphagnum peat or usually John Innes fertilizer. The original mixture would have been called a potting soil, but now after so many reuses, and additions, one would scarcely know what to call it. The corms still like it and grow well.

"I have about 90 such flats. They are placed on 2" x 4" timbers, which in turn are supported on short pieces of 2" x 4"

timbers to hold them at a proper distance apart as well as far enough above the soil surface to allow perfect drainage.

"Some such system might work with you, the flats being placed under cover the end of May, and either replanted or, with the addition of fertilizer, placed out of doors in October. * * * I think the greatest difficulty for you would be the early September or October rains, which would stimulate the corms into growth and flower at a time when they would be nipped.

"I usually have about seventy five percent flowering from small offsets handled in this way, and in almost every case they form good offsets for planting the following fall, also enough to make the system self perpetuating. My own experience, using this system, is that I seldom lose many of them, unless the temperature is below 24° F. Perhaps a sheet of pliofilm might give what little protection might be needed in an unusually cold spell."

As the editor has enough to do with things that do not have to be taken out of containers and stored for the summer, he doubts if he will follow this advice, but he has tried it out in part, leaving his corms in the flat which in turn was kept in a cold frame that was closed tight after May first to keep out rains and not opened to the weather again until autumn was cold enough to be called chilly, a term that you can define to suit yourself. The corms planted as small things did grow to maturity and did flower the following spring as Dr. Peery indicated they would. They were not then removed from the flat, but left once more *in situ*, no food or soil added, and given an identical treatment. They flowered the second spring as before but they did not show a reasonable increase, doubtless for lack of food. So, as far as the editor is concerned, ixias and sparaxis will become "annuals" in any gardening that he does here. Our rains come earlier than September, in fact come almost any time, and winter temperatures are not consistently low enough to prevent growth or high enough to be safe.—*Hayward, California, and Pass Christian, Mississippi.*



W. H. HODGE

A freshly picked ripe oriental persimmon (top), a frozen year-old fruit (right) just taken from home freezer storage (note frost on surface of fruit), and, at bottom, a thawed frozen fruit (one year old) ready for eating.

Freezing Persimmons

Few if any temperate fruits—aside from our common small berry fruits—lend themselves to storage in the unprocessed state in the home freezer. An exception is the persimmon, either the smaller fruited American species, *Diospyros virginiana*, native over most of the United States east of the Mississippi, or the larger fruited oriental species, *Diospyros kaki*, from China and Japan. Superior fruiting strains are available in each of these species.

My experience with freezing persimmons is limited to one of the several attractive varieties of the oriental persimmon or "kaki" which, though popular in the South, can be grown with some success at least as far north as Washington, D. C. This tree is actually an attractive one for the home grounds because its fruits, besides being edible, are extremely showy when ripe, being apple-sized and orange in color. What is more they persist until well after frost, hanging after leaves have fallen, thus producing a good display over a long period.



USDA (DORSETT)

Covered and uncovered oriental persimmons (about a million fruits!) prepared for open-air winter storage in a river bank persimmon orchard near Peking, China, 1924.

Those who are persimmon eaters are acquainted with the puckery (astringent) nature of fruits which are not fully ripe. The astringency is not lost, save in a few so-called "hard-fleshed" varieties, until the fruit is overly ripe, often it seems at the stage of spoiling. Subjection to a good frost is a distinct aid in dispelling the puckery-ness. As might be expected, the stage of maximum ripeness—when the skin is limp and loose, and the flesh very mushy—is also the time of peak flavor, but unfortunately the fruit has to be consumed immediately else it will spoil. Fortunately, in this day of the home freezer, fruits brought to peak ripeness can be quick-frozen immediately and then held indefinitely for future use. I have kept such fruits in the freezer for periods of over two years with excellent results simply by carefully wrapping each fully-ripe fruit in stand-

ard freezer paper and then freezing immediately. The fruit may be eaten thereafter at any time simply by allowing it to thaw and then eating immediately as one would a fresh ripe fruit.

The possibility of thus extending the ripe persimmon season indefinitely by placing in the modern home freezer was suggested to me by a report published 30 years ago, in pre-home-freezer days, by the United States Department of Agriculture (Circular No. 49) on the unique practice of outdoor winter-storage of persimmons in the vicinity of Peking, China. In that country the oriental persimmon is one of the most frequently cultivated staple fruits, "its importance being comparable to that of the apple in the United States." Frank N. Meyer, in an account on the oriental persimmon written nearly a half century ago, said:

"By careful handling and by keeping the persimmons at a low temperature they can be preserved for several months. To keep them through the winter, the Chinese pile them in heaps, let them freeze thoroughly, and keep them frozen until they are needed. When wanted, they are simply put into a vessel with cold water, to be thawed slowly, and they are then as good as when freshly picked. They can also be eaten when slightly frozen like sherbet, and occasionally are quite acceptable in that condition."

Meyer might have added that the winter storage by freezing outdoors of course renders the fruit free of all astringency besides extending the season of availability from October to late March.

Readers fond of persimmons and possessing extra space in their home freezers during the fall persimmon season may wish to try a modern innovation of a freezing trick developed centuries ago in China.—W. H. HODGE, *Longwood Gardens, Kennett Square, Pennsylvania.*

Two Broad-leaved Evergreen Shrubs

This winter, or perhaps late-winter—that-should-have-been-spring, we had our first bloom on the native *Osmanthus americanus*. As has been noted before, the shrub that is now almost tall enough to be called a small tree here, does not produce its flowers on the lower branches and twigs as does the Sweet Olive, *Osmanthus fragrans*. One had to reach fairly high to get them. They are indeed fragrant, with an odor that recalls the fruit, not the blossom of the lemon, but the scent did not diffuse far into the air, as does the scent of the Sweet Olive. The little blooms are much stiffer and, to my eye, more perfectly modeled than those of its more familiar kin.

In much more striking contrast, the whole of the plant of *Loropetalum chinense*, the Chinese first cousin to witch hazel, was covered with bloom, and to all local noses, scentless bloom. Our plant was brought here about seven years ago by a local nurseryman who had it from another nurseryman, for identification. Even then in its two and one-half inch pot, the leaves were characteristic enough in shape and position to identify it.

The little bush was planted on the border of one of the long azalea beds where it would be certain to get more than routine care. For about two years it showed no inclination to make much growth, but since then, all annual growths have been phenomenal. The tallest shoot is now about twelve feet high, like a great sail, with its main stem and the symmetrically set lateral branches. Bloom this season, which may have been late, came in mid- to late March and the whole plant was hung with the fine white blossoms, like fine fringe. Every visitor remarked on its beauty and noted that even without bloom, it was worth a place. The new growth came after the flowering, so that the white blossoms had the advantage of the dark old leaves as a setting. So far it is impossible to tell if there is any seed forming.

Why is this excellent plant so little used in the South? It is listed in many of the trade lists of lining out stock for wholesale disposal, so if you have a nurseryman in your town with any imagination at all, ask him to stock it. Neither he nor you will ever regret it.—B. Y. M., *Pass Christian, Mississippi.*

The Effects of Heat Versus Winds and Soils on Plant Growth and Survival in Southern California

Some well established principles pertaining to the physiology of plant growth and survival must be understood before an attempt is made to discuss the relative effects of heat versus wind and soils. The principle of multiple causation provides that similar end results can be brought about by varied combinations of intensities of environmental factors, such as: light, temperature, wind, moisture, soil constituents and biota. The principle of limiting factors emphasizes the environmental factor or factors which deviate most from their optimum intensities. Finally due consideration must be given to the degrees of diversity of requirements of different species, to the physiological variations within the species and/or varieties of the same species. For each species or variety there are the three cardinal points of intensity of environmental factors: minimum, opti-

mum and maximum. These cardinal points are usually applicable to the phenomenon of growth; but, differing only in the degrees of intensity, they apply equally well to that of survival. Growth, by definition, based on these cardinal points, ceases when one or more hypothetical factors exist at the minimum or maximum intensity for a given species or variety providing all other factors are present at some standard, preferably optimum intensities. Deviations from these optima will by definition as well as in practice change the minimum or maximum intensities of the hypothetical factors, as provided for in the principle of multiple causation. Statistical averages of sufficiently large numbers of examples tend to account for physiological differences among varieties of the same species or among members of the same variety.

The problems of interpretation of observations or data are relatively simple under experimentally controlled conditions wherein the intensity of one factor is varied at a time. Under field conditions dealing with those factors which cannot be controlled, agreement among careful and critical observers who apply the above principles and criteria is desired and tentatively plausible. In view of the above methods of evaluation of observations some interpretations of plant responses are believed justified in the article published in Volume 36, *Nat. Hort. Mag.*, October 1957. These interpretations can be extended by further discussing the effects of heat versus wind and soil on plant growth and survival.

One part of the plant response paper emphasizes the September heat waves of 1939 and 1955, but not to the exclusion of other environmental factors. Now, after 23 years of observations of *Eucalyptus globulus*, Tasmanian Blue Gum, growing in the Santa Monica Mountains of Southern California, it is possible to present some significant facts. In January 1935 I planted two groups of these Blue Gum seedlings averaging about one-eighth of an inch in diameter and one foot tall. Two planting areas were selected differing greatly in soil moisture and somewhat in exposure to desiccating winds. One area on a northern declivity has abundance of water, being located below a thoroughly watered lawn and

drainage tile from a septic tank. The second area, also on a north slope nearby, extending to the level of the pass between two ridges, received no artificial watering after the first or second year. The largest of the seven trees in area one now has a maximum diameter of 30 inches three feet above the ground level. None of the trees of this area has ever shown any apparent or significant injury from heat and/or desiccating winds. A microscopic examination of the adult leaves showed definitely a xeromorphic anatomy compared to that of the juvenile leaves. The adult leaves appear to be drought resistant, and are pendulous on short petioles, therefore they are believed to be favored by wind currents in their photosynthetic activity. Furthermore, wind can have a cooling effect because of thermal emissivity. This cooling effect may actually reduce water loss from the leaves, and therefore wind can have a protective influence under certain conditions, particularly adequate soil water.

The second area has ten trees, two of which are dead, but still standing. Because of the surface contour of the terrain somewhat to the east and west of these dead trees, they have evidently been exposed to greater amounts of desiccating winds than the live, adjacent trees at the same level. Theoretically more water and/or lower extremes of high temperatures could have saved these dead trees. When the hydrothermal cooling system fails because of high temperatures, desiccating winds and/or inadequate water supply, the trees die. This does not exclude other lethal combinations.

This species of *Eucalyptus*, Tasmanian Blue Gum, is used as a windbreak in Southern California citrus orchards. This Blue Gum is relatively free of infectious diseases, although old trees in Exposition Park, Los Angeles, have borne large *Polyporus* sporophores year after year for many years. Huge trees with twisted stems (spiral growth) also in Exposition Park appear to be healthy where soil moisture is adequate. This species is well adapted for coastal Southern California below 2000 feet, and inland approximately 100 miles provided soil moisture is abundant. However, unusually high temperatures for several days, accompanied by desiccating winds and inade-

quate soil moisture comprise a lethal combination of environmental factors for this somewhat drought resistant species.

This account of *Eucalyptus globulus* does not minimize the effects of desiccating winds on citrus or other less drought resistant species in Southern California. Reed and Bartholomew have given an extensive account of the effects of desiccating winds on citrus trees in Bull. 484 (1930) of the Calif. Agric. Expt. Sta. Although soil water relations have been emphasized in the above account of *Eucalyptus*, a more comprehensive coverage is available in House Doc. No. 398, U.S.D.A., 1938 Yearbook, "Soils and Men."

There are many areas in Southern California where various crop plants cannot be grown successfully under natural conditions because of high summer temperatures, desiccating winds and inadequate soil moisture, naming only a few of the adverse environmental factors. Water has been interpreted as the elixir of life in the desert or semi-desert areas. Man has added water to many of these areas and thereby converted them into veritable gardens. Man has also done something to curtail the severity of hot, desiccating winds by the use of windbreaks of selected drought and wind resistant trees whose leaves have a cooling effect because of thermal emissivity. During transpiration of water from the leaves water is changed to vapor and heat escapes as kinetic energy of the water-vapor molecules.

Finally it seems feasible in summarizing the above principles and their applications that most any plant in Southern California or elsewhere living near its physiological margin of tolerance because one or more environmental factors are maintained at minimum intensities will succumb to any adverse change of sufficient magnitude in one of these or any one of several other environmental factors. The magnitude of such a change measured in time and intensity has an important bearing on the degree of the plant's resistance.—GEORGE R. JOHNSTONE, 7267 Pacific View Drive, Los Angeles 28, California.

(A Note of Correction for the original article, Vol. 36, No. 4, page 341: In the 25th printed line of the first column, "1938" should read "1933" and a subhead, "Topic of Data, p. 342" should be added between the 35th and 36th lines in column 2. On the last line of the data given in Table 1, page 342, and after "Cling peach tree," "Data, p. 341," should be added. Ed.)

A "New" Dutch Iris, and Others

Each season, it has been the editor's practice to buy bulbs of the various Dutch iris, particularly the new names that appear in the lists since these bulbs do particularly well in these parts and represent a change from his past all dotted about with species and tall bearded.

Among those that bloomed here for the first time this season, the most outstanding was Prof. Blaauw, a very vigorous clone with fine conspicuously broad foliage, sturdy stalk up to 20 inches and flowers of size and definitely a blue tone rather than the blue purple of the commonly advertised "blues." It is true that the "blue" will not be found among the true blues of any color chart, but the effect is blue at a distance. It is much more charming than Blue Pearl, also new here, which had a rather dead quality to the color and in the particular planting a tendency to topple over so that the stalks were bent as much as the stems of unpruned chrysanthemums.

Blue Champion turned out to be a little later in flower than the two mentioned above that bloom together, as tall and as vigorous as Prof. Blaauw, and distinctly lighter in color, although no color reading was taken. It is not as light as the charming Lady Derby that was offered one season and never since.

As a first trial here, a collection of Spanish iris varieties was purchased, the beguiling catalogue note saying that they bloomed two weeks after the Dutch. Some do, and some do not here! They are as nice as any but are definitely more slender in all their parts, and the color range is about the same. Le Mogul is precisely the color of the Dutch Ankara, and later. Yellow Prince and Pride of Holland bloomed about the same time and were not distinguishable in garden effect, but different in detail and shape of the floral parts. Enchantress was probably the most lovely of those grown with light blue lavender falls, with the usual yellow signal patch, and more blue purple standards. It is one of the last to bloom, although the Dutch clone, Lemon Queen, has barely finished.

This autumn will see the planting of still other "names."—B. Y. M., Pass Christian, Mississippi.



Odontadenia grandiflora

Odontadenia grandiflora

The family APOCYNACEAE contains numerous plants with attractive flowers. Many of these are tropical and include Plumeria, the temple flower or frangipani, a large shrub or small tree native of the tropics of the New World, widely cultivated in the tropics of the Old for the beauty and perfume of its blossoms. Not all members of this family are shrubs or trees, many are climbers, e.g., Allamanda, Dipladenia, Mandevilla, and of these *Odontadenia* is probably the most beautiful. The genus contains about twenty species but one is far better known than others; it is *O. grandiflora*, referred to in some floras as *O. speciosa*. It is almost certainly true to say that there is no botanic garden in the tropics of the world where this climber is not

cultivated—if it is not, it should be. It is also to be seen in most botanic gardens in temperate regions where there is a tropical house sufficiently hot and damp for its needs.

Those who cultivate the plant do not always appreciate one essential condition for its health and that is an abundance of water around its roots; unlike most plants, it thrives when its feet are wet. I know the plant in the wild both in South America and in Trinidad. In British Guiana it grows in the lowlands on tree-covered banks on either side of the canals leading into the sugar-cane fields; it also grows on the banks of the large rivers like the Essequibo where, when the rivers flood in the rains, the base of the plant is completely submerged. In Trinidad I have found it in four districts. In every instance either

the roots and lower stems are in swamp or in land often submerged in moving flood-water. It may well be that if the water remains stagnant, and therefore deficient in oxygen, for a long period the plant will die.

If the base of the plant is in the shade, leafless shoots are produced from the base which grow extremely fast, elongating at the rate of 4 or even 5 inches a day. Should a shoot not come in contact with a neighboring tree it will sag and touch the ground and continue its growth horizontally. Where such a stem touches the swampy ground it will get covered with fallen leaves and will root freely. Thus, in the wild, the plant extends its range radially from the original center—a method common to many tropical lianas. The shoot twines in a contra-clockwise direction up a convenient support until it reaches the light, when it develops, in opposite pairs, its glossy lanceolate leaves. These may reach a length of 12 and a width of 6 inches. A feature of the plant, characteristic of the family, is the liberation when wounded of a white milky latex. This is very similar to the latex produced by rubber trees, from which natural rubber is made by precipitating the solid materials held in suspension.

The flowers are borne on large branched terminal cymes of which the central bud of each cluster opens first. The beautiful flower is 3 or more inches across; it is salver-shaped and the petal-lobes are arranged as the blades of a propeller, a characteristic of all members of the family. The tube is yellow, finely streaked on the inside with deep apricot; the petals, save for a narrow triangle on the left edge of each which is yellow, are of a delicate shade of apricot. The fragrance is to me reminiscent of a bunch of primroses with a single carnation in its center. This climber flowers several times a year and is in fact as often in flower as not.

It may be propagated by layering a section of horizontal stem; by ringing a stem, applying a drop of rooting hormone solution, and surrounding the ringed stem with a handful of damp moss wrapped with polyethylene film and tied firmly at each end; by cuttings treated with rooting hormone and then inserted in a suitable compost and kept in a saturated atmosphere and by seeds.

The seed pods are large and woody, develop in pairs (though one may abort), and when ripe are packed with brown seeds. Each is 2 inches long and tipped at one end with a pappus of hairs which serves as a parachute. When the pod splits the seeds are carried far and wide by the wind. Seed pods are rarely formed in cultivation. The seeds do not retain their viability for long and should be sown as soon as possible.

There is a second smaller species wild and common in Trinidad, called *O. nitida*, on account of its beautiful shining leaves. The flowers which are much smaller are unfortunately lacking in fragrance but the plant is nevertheless attractive.—G. A. C. HERKLOTS, *The Imperial College of Tropical Agriculture, Trinidad*.

Dawn Redwood in Alabama

Metasequoia glyptostroboides, the Dawn Redwood, is a pretty tree, planted in the broken shade of longleaf pines and water oaks. My tree is six feet tall and one inch in caliper at the base, and from a distance looks very much like its relative, the Bald Cypress, *Taxodium distichum*. The light green feathery foliage is heavier than that of the Bald Cypress and the branching is opposite instead of alternate as in that species.

The rate of growth has not been exceptionally fast for me, since it has taken five full growing seasons to achieve its present height.

The soil in which it is planted is a fine sandy loam naturally low in all major plant food elements. The fact does not seem to have detracted from the appearance of the tree, only in its growth rate. This year I intend to fertilize young trees to test fertilizer response.

As for propagation, with unprofessional methods I have used, there has been some success. Cuttings of current season growth were taken in June 1957. All needles were stripped off the lower three or four inches and a whorl or Y-branch retained at the tip. The cuttings were placed in a deep flat of plain sand as the rooting medium and the flat covered with a pane of glass. Cuttings were lifted in nineteen weeks, well rooted. Undoubtedly roots had formed much sooner but the flats were not examined before then.—EDWARD J. HORDER, *Fairhope, Alabama*.

Dawn Redwood in Mississippi

In midsummer of 1957 a sack with four trees of the Dawn Redwood in cans was received here, and as the roots had traveled in all directions from the bases of the partly ruined cans, and since such planting in midsummer is not advisable here, the four were heeled in in a shady position where they could be sure to get watering if needed. There was a fair recovery of tops from the mangled branches as received and the plants went into the winter dormant and with nice buds showing on all branches.

They were moved into permanent positions in the early spring, and growth developed promptly, in time in fact to pass through one of the 12-degree frosts that we had early in the season. No damage!

After growth was well under way, one of the trees collapsed completely and died. No explanation is offered. The remaining three plants are unequal in growth, but all appear to be in health. They are planted in beds prepared for azaleas, with ample peat moss added to the sandy loam that is more sand than loam. For the present the growths are mainly lateral, but it is too early in the season to tell if leaders may not develop.

The trees were planted in the positions to see whether or not they will provide the early shade that we are still looking for as a slight protection to early blooming azaleas.—B. Y. M., *Pass Christian, Mississippi*.

and experimental stations. Of the 1100 individual items accessioned as a result of this exploration about one half represented seed collections and the remainder vegetative material. This exploration for ornamentals represents the third in a series undertaken by the New Crops Research Branch of the United States Department of Agriculture working in cooperation with Longwood Gardens.

An Experience with Belladonna Lily

In late 1949 I planted three huge bulbs that I assumed to be those of *Lycoris squamigera*. After they finally bloomed and ripened their mother-of-pearl like seeds I knew them to be the Belladonna Lily so long listed as *Amaryllis belladonna* but for the last several years offered as *Brunsvigea rosea*.

The bulbs were planted with the tips barely covered in an exposed perfectly drained spot chosen for convenience instead of suitability. The soil was too poor to grow good weeds, medium heavy, chiefly yellow clay, and close to neutral, even though this is limestone country.

When I returned home each year in March I found my established lycoris and the new bulbs all in full leaf. The only obvious difference was that the leaf tips of the new bulbs were always frozen back an inch or so.

In the summer of 1954 all three bulbs bloomed, one bearing two scapes. After the seed ripened I lifted two bulbs, finding three small bulbs where each had been planted. Two bulbs I gave away, four I replanted in better soil. That fall I mulched several of the bulbs before leaving home. Mulched and unmulched bulbs alike came through that winter untouched, only to be cut back completely by the unprecedented late March freeze of 1955. After such a setback I expected no bloom for four or five years, inasmuch as bulbs are reported to sulk that long in English and California gardens after untoward treatment. Two of the transplanted bulbs, however, bloomed well in 1957.—MAUD R. JACOBS, *South Carrollton, Kentucky*.

Exploration for Ornamentals in Southern Brazil

During mid-May of the present year Dr. Llewellyn Williams, USDA plant explorer, completed a three-months-long exploration for ornamental plants in southern Brazil and adjacent regions of Argentina. Special emphasis was placed upon flowering sub-tropical trees. Principal Brazilian states visited included São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul. Collections were made in the wild as well as in outstanding private and public gardens, arboreta



Key to Two Ground-covering Species of Ardisia

1. Rhizomatous; stems rising sharply erect, minutely puberulent when young; leaves glabrous, dark green, margins finely serrate (illustrated above) *Ardisia japonica*
2. Stoloniferous; stems trailing, densely villous; leaves villous, especially along petioles and veins, light green, margins coarsely serrate (illustrated below) *Ardisia pusilla*



Two Ground-covering Species of *Ardisia*

The species of *Ardisia* which are occasionally cultivated as garden plants in the southern United States are all small to medium shrubs. These are *Ardisia crispa*, *A. humilis*, and *A. polyccephala*. Only *A. crispa* (*A. crenulata*) grows outside of subtropical Florida. This species can be found naturalized in certain parts of Louisiana where seeds have been carried from old gardens. Such an adaptation is understandable since *A. crispa* is native to southern Japan and to South China where it grows in warm temperate forests that experience several degrees of frost. The other two species are native to India.

Two prostrate species of *Ardisia* occur in the same localities of Japan and China as *A. crispa* but, at best, are rare in cultivation. These are *A. japonica* and *A. pusilla*. Both species are ground-covers yet this fact has largely escaped the authors of the descriptions which appear in the standard horticultural references.

Ardisia japonica is a prostrate, evergreen shrub, spreading by means of ramifying rhizomes which develop into erect shoots, 6 to 10 inches high. The leaves are clustered at the stem tips in whorls, broad-ovate, 1 to 3 inches long, $\frac{1}{2}$ to $\frac{1}{2}$ inches wide, bright green, finely serrate, and glabrous, except for the petioles, which are minutely puberulent like the young stems. The flowers are borne in racemes, 2 to 6, about $\frac{1}{2}$ inch across, white marked with fine brown lines, petals 5; calyx white, lobes broadly overlapping, similarly marked as the corolla segments. The fruits are globose, about $\frac{1}{4}$ inch in diameter, on pedicels $\frac{1}{2}$ to $\frac{3}{4}$ inches long.

Ardisia japonica is naturally distributed in southern Japan, where it may be found on the outskirts of Tokyo, to South China, where specimens were once collected by F. N. Meyer, near Hang-chow, in the coastal province of Chekiang. Meyer's notes describe *A. japonica* as a crawling, woody vine only a few inches high, in shady places on rocky slopes. In Japan, this species is cultivated under the name of *Bladhia ja-*

ponica and has been used as a ground-cover in the garden of Nijo Detached Palace, Kyoto, for almost 400 years.

The plant first appeared in the gardens of England about 1830. In the United States, unfortunately, *A. japonica* has been overlooked. This is surprising since Rehder attributes hardiness qualities that would place it in Zone VI. The most extensive planting I have seen occurs in a sunken Japanese garden at the McIlhenny Estate, Avery Island, Louisiana, where the colony of *A. japonica* covers a small bank in the same manner as does pachysandra. *Ardisia japonica* is being propagated by Tom Dodd Nurseries, Semmes, Alabama.

Ardisia pusilla (*Bladhia villosa*) is a prostrate, stoloniferous, evergreen shrub with trailing stems that root to the ground. The leaves, in whorls of 3 to 5 along the stems, are ovate, $\frac{1}{4}$ to 2 inches long, $\frac{1}{2}$ to 1 inch wide; coarsely serrate. The young stems to a lesser extent are rusty villous. The expanding leaves are at first pink. The flowers are borne in racemes of up to 12 flowers; these are white, about $\frac{1}{4}$ inch across, faintly marked as for *A. japonica*, petals 5. Calyx green, segments narrow-lanceolate, about as long as the corolla. The fruits are red, $\frac{1}{8}$ to $\frac{1}{4}$ inches in diameter, on pedicels $\frac{1}{2}$ to $\frac{3}{4}$ inches long.

Ardisia pusilla grows wild in the forests of the Grand Gégu Shrine at Ise, Japan, and has been collected by the writer in the damp, shady forests of Yakushima. It also occurs in Kwantung Province, South China, where specimens in the herbarium of the National Arboretum were collected. *Ardisia pusilla* does not appear to be in cultivation either in Japan or the United States but it is now under test (P. I. 235308) by the U. S. Department of Agriculture.

In view of the fact that both species are prostrate ground-covers, a simple key to their identity seems desirable. It should be noted, however, that there are possibly additional prostrate species, native to China, that are probably not yet in cultivation.—JOHN L. CREECH, U. S. Plant Introduction Garden, Glenn Dale, Maryland.

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Lunaria annua

